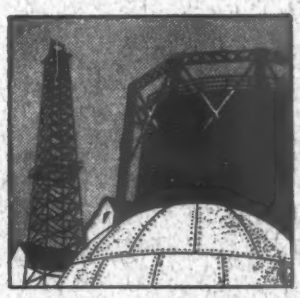
AMERICAN GAS ASSOCIATION MONTHLY



Foundries Turn to Gas for Annealing
C. B. PHILLIPS

▲

First Natural Gas Sales Conference

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Natural Gas Building a New Industrial Southwest
H. J. STRUTH

Samuel Insull for Continuance of Bold, Open Publicity Policy

Year 'Round Air Conditioning
EUGENE D. MILENER

▲

Canadian Gas Industry Sets New Records
ARTHUR HEWITT

▲

The Ultimate in Baking—Gas for Largest Bakery
J. B. NEALEY

March, 1930

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Public Utilities and Advertising

IN a brief prepared by William H. Hodge, vice-president and manager sales and advertising department, Byllesby Engineering and Management Corporation, for presentation to the Federal Trade Commission in its utilities inquiry, there are some figures which lead to interesting speculation. A summary of this brief will be found on page 128 of this issue of "Printers' Ink."

We are not going to discuss the merits of the contention on the part of enemies of utilities that they have sought to influence public opinion by exerting pressure on newspapers. What is important to the whole advertising profession is the fact that Governmental investigators and legislators are quick to seize upon legitimate advertising expenditure as evidence of an effort to use improper influence on publishers.

We are not foolish enough to state that advertisers do not try to influence publishers. The big stick of advertising has been waved threateningly many times, as any publisher will testify. The point is that in most cases the publisher is too jealous of his prerogatives and has too keen a realization that the advertiser needs his medium quite as much as his advertisers to be intimidated by such threats. It is a pretty well exploded belief that such advertising influence is exerted widely.

Regardless of this fact, Washington investigators are setting a dangerous precedent when they make it necessary for advertisers to defend their advertising investments. It is brought out clearly in the brief that the utility companies have not been spending as much, comparatively, as they should spend. If they are to be chided it should be because of the paucity of their expenditures and not because of their large size.

Efforts have been made by all types of reformers to show that the heavy advertising investments of their pet aversions stand in the way of any printed support of their efforts. In fact any reformer who sees his efforts meeting with a lack of what he feels they deserve is quick to shout loudly that his work is being turned to naught by the money spent in advertising by those whom he attacks.

Of extra-Governmental reformers little need be said. Their success is usually as limited as their point of view, unless the reforms they advocate are worthy, when, as experience has proved, they receive plenty of support. When Governmental agencies, however, begin to look upon legitimate advertising as an effort to influence publishers, advertisers generally will do well to protest.

Private expressions of several utility advertisers lead us to believe that one thing today which is holding this industry back from a wider use of advertising is the fear that Governmental reformers will seize upon increased expenditures as an excuse for accusation of undue pressure on publishers. Other industries which deal with the public in a large way and which are subject to Governmental prying are also being discouraged for the same reason. This is not a wholesome condition and it is a condition which can easily spread among all our large advertisers. If the day comes when advertising appropriations are determined not by marketing needs but rather by what the Government will say, American business will suffer sadly.

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AMERICAN GAS ASSOCIATION MONTHLY

Allyn B. Tunis, Editor

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OUR OWN WHO'S WHO

LVIII

Burton Smart

BURTON SMART, treasurer of the Portland Gas Light Company, was born at Portland, Maine, in 1873. He attended local schools and college and first was employed in the wholesale lumber business of Smart & Doten, 1890-1893. Then he joined John P. Squire Company, wholesale pork products, in Boston, and remained there until 1895, in the accounting department.

On October 13, 1895, Mr. Smart entered the employ of the Portland Gas Light Company as accountant, cashier and bookkeeper, being elected treasurer and clerk of the board in 1900, which position he has held continuously for more than thirty years.

He was treasurer of the Portland Rotary Club for five years; of the local Chamber of Commerce three years; president of the New England Gas Association in 1922; president of the New England Guild of Gas Managers in 1923; director in both organizations three years; New England representative to American Gas Association from accounting section, 1929; now chairman of the Accounting Section, New England Gas Association, having been elected Janaury 3, 1930; now president of the Portland Club, one of the strongest Republican organizations in Maine with a membership of 550 leading legal and professional men of the State.

Mr. Smart is married, has five children; is a Congregationalist, charter member of the Rotary Club, Round Table, Economic, Chamber of Commerce, Portland Club, director of the Portland Boys' Club, State Street Club, Associated Industries of Maine and many other civic bodies.

AMERICAN GAS ASSOCIATION MONTHLY

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Truth in Publicity Can't Hurt Utilities

Samuel Insull

Samuel Insull for Continuance of Bold, Open Policy

SAMUEL INSULL was the principal speaker at a luncheon at the Palmer House, Chicago, January 28, in celebration of the eleventh birthday of the Illinois Committee on Public Utility Information. John F. Gilchrist, chairman of the committee since its inception, presided, and the work of the committee, which is supported by practically all the electric light and power, gas, and electric railway utilities of Illinois, was reviewed by Bernard J. Mullaney, president of the American Gas Association, who has been the director of the committee during its entire existence.

The luncheon was attended by about 125 utility men from all sections of Illinois. Mr. Insull, who suggested the organization of the committee eleven years ago, said:

"The responsibility, credit or discredit whichever you may choose to call it—for originating this work, falls upon me. I had experience, as chairman of the Illinois State Council of Defense, in arousing the State to a sense of its responsibilities and duties in connection with the war. It seemed to me that if the plan we used could be followed in the utility business, it might be of some value to us.

"Mr. Mullaney told you that my suggestion was made at a meeting of the Illinois Gas Association, in Chicago, on the nineteenth of March, 1919. I am going to take the liberty of reading to you what I had to say at that time. We were just emerging from the war; we were trying as utilities to get on our feet. Regulating bodies were faced with an entirely new situation for them. For years prior to the war such of them as existed had been engaged in regulating us downward. It was necessary that we should educate the regulatory bodies and the public to the facts of our then condi-

tion that we might get the relief most of us had to have, and which they subsequently gave us.

"At the meeting on the nineteenth of March, 1919, I said:

"'I am a great believer in publicity. I believe it is our duty to the properties we manage, and the stockholders who own them, and to the communities we serve, that we should enlighten them on the situation. I believe in doing it, not in any gumshoe way; but openly and boldly. I believe in presenting the facts to the employees, whose interest is just as vital as that of the managers; to the citizens of the State who are the owners of the properties; to every customer of a gas company, an electric light and power company, or an electric railway.

"'The public utilities have the means of getting at their customers, of getting at nearly every household in the State. If that is done, the politician in quest of the facts will be forced to discuss utility questions on the basis of economic facts, and not by drawing on his imagination to create prejudice against a great industry.

"'If we, openly and boldly, do our share in this crisis by challenging the fallacies and misrepresentations uttered against the public utility business, we shall be doing a service to the whole State, and to the future generations of its citizens.'

"Almost eleven years have elapsed since then, but I stand by that address. I advocated an honest, open policy, and I believe that that policy has been carried out honestly and openly by the Illinois Committee, just as it has been by a number of other similar committees that followed our example in other parts of the United States.

"A great many new conditions have arisen since that time. The utilities have had a tremendous growth. But I think there is just as much need of open, frank and honest publicity concerning what we are doing, and what we hope to do, as existed at that time.

"A large and expanding industry like ours is always subject to public and political misunderstanding, and to more or less public and political jealousy. New generations are constantly coming along, taking an interest in public affairs. New politicians are taking the place of the old politicians. These coming generations and politicians need to be told the facts about our enterprises just as much today, as they needed to be told the facts eleven years ago.

"They need to get a better understanding of utility financing, its peculiarities and its requirements; the difference that exists between the financing of an industry where you only turn your capital over once in four or five or six years, and an industry that turns its capital a number of times a year.

"With the growth of holding companies—which have performed a very remarkable service in the development of the electric and gas services, especially to the smaller communities of the country—and with these companies assuming such tremendous proportions as financial institutions, it is necessary that the work which these companies do, and their method of doing it, should be thoroughly understood by our people, whether it be the private citizen or the politician.

"Then the subject of rate-making is a subject which calls for a great deal of educational work. It is a common thing to read in the daily press of the splitting up of capital stock, the creation of big holding companies, the erection of great financial edifices for the extension of the utility business; and it is a common thing for the every-day, ordinary politician, and for the private citizen, to assume that this means a greater burden upon the people, instead of a lesser one, as is the case, as a rule. It is necessary that we should carry to our customers the message that rate-making is not based upon capitalization, but is based upon the value of the property used and useful in the industry. This educational work can be done to very great advantage by such an institution as the Illinois Committee.

"Also there is the question of regulation. If you should accept the statements generally made by politicians, especially politicians engaged in national affairs, you would naturally assume that the greater part of the energy produced in this country is energy which can be classed as belonging to interstate trade. Whereas, as a matter of fact, of the amount of energy produced in the United States, but a very small proportion of it crosses state lines.

"That very small percentage is the only portion of our business that can be considered at all as having an interstate character. Hence there is little warrant, in fact, for national or federal interference in state affairs, insofar as our industry is concerned. But it is only by the work of such organizations as the Illinois Committee, that you can expect that fact to be brought home to our customers, and brought home to them in a way which will lead them to the conclusion that they are infinitely better off, and are infinitely more likely to get proper protection under state regulatory bodies than they are under federal regulatory bodies.

"Rural electrification is a very broad field to which this Committee ought to give a great deal of attention. Our various enterprises operating in the State also need to give a great deal of attention to that subject. It is a perfectly natural thing for a farmer to have more or less resentment against the power company whose high-tension transmission line crosses his farm, unless provision is made to give him service locally.

"In addition to educating the farmer as to the desirability of electrification, I think that this Committee could per-

(Continued on page 137)

"If we, openly and boldly, do our share in this crisis by challenging the fallacies and misrepresentations uttered against the public utility business, we shall be doing a service to the whole State, and to the future generations of its citizens."

—Samuel Insull, March 19, 1919.

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"A great many new conditions have arisen since that time. The utilities have had a tremendous growth. But I think there is just as much need of open, frank and honest publicity concerning what we are doing and what we hope to do, as existed at that time."

—Samuel Insull, January 28, 1930.

First Natural Gas Sales Conference

The Union Gas & Electric Company Building, Cincinnati, Ohio, showing partially completed meter installation. This eighteen-story office building is heated with gas, and the metering installation consists of three numerical index 60 C tin meters having a maximum capacity of 18,000 cu.ft. per hr. at ½-inch drop. The meters are served with an 8-inch low-pressure service. The maximum consumption in the building for heating, kitchen use, and water heating will be 16,000 cu.ft. per hr. It was described at the Natural Gas Conference by E. A. Munyan, manager of the Gas Department, Union Gas & Electric Company.

A RECORD-BREAKING attendance, 285 representatives of the industry, gathered in Pittsburgh, Pa., February 10 and 11 to take part in the first Natural Gas Regional Sales Conference, which was held at the Hotel Schenley. Those present came from Pennsylvania, Ohio, West Virginia, Maryland, New York and Kentucky.

Under the guiding hand of Reid Cameron, Manufacturers Light and Heat Company, Pittsburgh, assisted by members of his Committee on Arrangements, a well-rounded program was carried out with clock-like precision.

C. E. Paige, vice-president of the American Gas Association, under whose auspices the Conference was held, was the principal speaker at the luncheon on the opening day.

Sales and merchandising formed the keynote of the meeting, and the subject was discussed from all angles by men well-known in the industry.

One of several interesting papers presented at the Conference was that on "Cooperation by the Operating, Utilization and Sales Departments in Promoting Sales," which was submitted by S. B. Severson of the Republic Light, Heat and Power Co., Buffalo, N. Y. It follows:

"The natural gas industry had its start on the shores of Lake Erie some miles from here about a hundred years ago. From a small beginning it has, after many vicissitudes, arrived today as one of the largest of industries. Through the years of its existence and until recently there have been times when its continued survival has in many cases caused serious speculation.

"Many natural gas companies in the past were formed primarily for promotion purposes and, therefore, were uneconomical and wasteful. Natural gas was considered *cheap* and was treated accordingly. It was wasted not only because of the ridiculously low rates but by wasteful production practices, by poorly designed transportation and distribution systems, and by its use through inefficient apparatus and appliances.

"In the early days natural gas was apparently plentiful in local pools and users were relatively few, but as time went on local supplies diminished and extensions into distant fields were necessary causing large investments and gradually a large increase in users. Poor service, especially in winter months, occurred which caused serious depletion in earnings, together with increasing unpopularity. The important operations of the natural gas business were production, transportation and distribution with no thought of a sales organization as such. Many smaller and rapidly expiring companies were eventually consolidated into larger groups with consequent better business policies. Distribution centers were revamped somewhat according to the manufactured gas practice, causing more efficient and effective conditions through improved operation and utilization. Later sales organizations were gradually introduced.

"Why is it necessary in this day to question the benefit cooperation between the sales and operating departments will have on the promotion of sales and the welfare of the industry? Principally because of the way the natural gas industry developed and from the general opinion that natural gas can sell itself, also because it has been thought that no competition existed and that the public would sooner or later turn to us to supply their wants. In other words, the operating men could see no need for a sales organization where a business had to offer a commodity so apparently plentiful, useful and cheap.

"The company with which I am connected started a sales organization known as the New Business Department more than twenty-five years ago in its electric and manufactured gas properties. It was, for us, a short step to introduce new business methods into our natural gas properties as they were acquired. Even here gradual development was necessary for the operating departments to realize the need of sales organizations, as it has also taken the sales organizations time to realize the need industry has

for the close, friendly cooperation between all departments in its service. We are public servants and the public demands more than ever the best service a company can render. Unless friendly cooperation exists within the organization in and between its departments, the development of good will, which is our greatest assest from a sales standpoint and generally, will be seriously handicapped.

"Every department must consider the needs of the public and of each other. The management, of necessity, must insist upon the highest efficiency and closest cooperation by everyone in its employ. Due to diversity of duties, various departments work under different conditions and different methods of compensation but this must not effect the morale of the organization. The policies of the organization must be such that the individuals receive just consideration, both as to working conditions and compensation, that dissatisfaction will be minimized and eliminated.

"That new customers may be added and business increased from all sources, an efficient sales organization for both domestic and industrial sales is of great importance. The most efficient and best appliances must be displayed in modern, up-to-date sales rooms, but unless other departments have, and are, properly functioning to furnish and safeguard an adequate supply of gas, have properly arranged for the necessary efficient distribution and men have been properly trained to install equipment, and in fact, all connected with the organization have been instructed how properly to meet customers in our offices, their places of business and homes, the efforts of the selling organization will be ineffectual and may even be a detriment to the welfare of the organization. All sales must be accompanied by friendly, efficient service.

"The utilization department must determine the best and most efficient appliances and equipment for the ever growing customer demand. Leaders in our industry now realize there are broad fields for service, that possibilities of domestic and industrial sales are tremendous, to say nothing of fields that may be opened by further research and utilization methods.

"The sales organization must have the support of all departments as well as the management to obtain results. It functions further than the mere selling of appliances and consequently gas. Our salesmen are our good will agents, due to their constant and continuous personal contact with the customer. An indifferent, careless, surly service man, meter reader, or clerk may cause more harm than a corps of salesmen can overcome. With the increasing demand for automatic equipment, salesmen are afforded opportunities to sell real comforts in the home, as well as efficient and easily regulated appliances for commercial and industrial purposes, but due to such equipment more expert, efficient, diplomatic men must be trained and employed in our service.

"I believe that one of the essentials of the industry is the training of employees effectually to understand the present and future possibilities and the necessity for better service to the customer than ever before. The customers' necessities and demands are rapidly increasing as well as the competition of other fuels. There are many ways in which employees can be developed to produce better service to our customers and to live happily together while performing such service. One way I know of is used in our own company with proven success. We believe in get-together meetings, general and departmental. In our several properties we have fraternities for men employees and auxiliaries for women employees where membership and attendance are voluntary. Monthly, well-attended meetings are held where our problems are discussed. The welfare and social activities of the company are taken care of through these fraternities thereby giving excellent opportunity to gain the close acquaintanceship which is essential to mutual understanding. Weekly meetings are held by various departments and daily meetings are conducted regularly by our sales organization. Through these meetings the management has an opportunity to promote its policies and principles as well as foster the interests of the individual employee. We believe in and operate on the principle that the customer is the principal factor in our business and therefore of necessity we must properly instruct our employees for efficient and friendly cooperation. All must work together for the good of the customer, otherwise much of our effort will be uselessly expended.

"Now that the natural gas industry has turned away from the old and mistaken idea that a supply of gas is all sufficient, and has moved its offices and show rooms onto the main street and has become increasingly active in civic affairs, we must be more particular to render service that will create popularity for us and our product. Popularity of our product will insure safety and prosperity, also further incentive for employees to continue in friendly cooperation while performing a profitable service.

"It should never be considered that salesmen have a priority claim to extend good will. All employees are our agents in this respect. Through customer ownership activities, as an example, it has been clearly demonstrated that all employees can meet the public and produce friends. A meter reader or clerk can make as many friends as anyone. All the good contacts that are made help break down the resistance for a selling organization.

"We must of necessity appropriate real money and effort to increase and maintain our gas sales. The cost will increase as competition increases and the public requirements become more exacting, therefore, the urgent need of the industry is to keep itself continually before the public and increasingly solicit and maintain its approval. Our sales organization must be on the alert for new methods and pursue an aggressive sales policy. Its success will largely depend upon the friendly, constructive assistance of associates in all other departments.

"The most beautiful and efficient gas appliance will remain only an expensive ornament and a source of ill will unless it is properly installed, receives gas at regular and uniform pressure, and satisfactory service furnished with a smile and payments for gas or equipment graciously received.

"I could enumerate various methods in use whereby the individual and departments can help the sales organization in its activities but they are almost automatic if the spirit of friendly cooperation exists and is maintained."

New Publication Designed to Aid Gas Sales Executives

VOLUME 1, Number 1 of *The MCF Builder,* published by the Commercial Section of the American Gas Association, made its bow to the sales executives of the gas industry last month.

The Builder describes itself as "a sales bulletin for executives of member companies, designed as a medium for the interchanging of ideas, suggestions and plans relating to better load building methods."

The Builder, of which Harry W. Ewald, Equitable Gas Company, Pittsburgh, Pa., is editor, made its initial appearance as an eight page booklet, 8½ x 11 inches in size. It is profusely illustrated, emphasizing pictures of gas appliances, showing types of appliance advertising, together with charts of general sales conditions. The February number is devoted almost exclusively to pointing out the load-building possibilities of gas refrigeration.

The new publication's salutatory follows:

"This *MCF Builder* is the outgrowth of the 'Interim Committee Reports' used so successfully last year to acquaint the executives of the member companies with sales plans and policies. This little bulletin will give actual sales plans used in securing outstanding results in selling load building appliances. It will give sales promotional ideas and general load building data secured from many sections of the country.

"To assist in this big task a special committee was appointed to work with the Editor and the chairmen of the respective committees. This committee will assist also in obtaining helpful commercial articles in trade magazines scheduling them, if possible, concurrently with the subjects treated in *The MCF Builder.* In other words, this committee is charged with the responsibilities of showing executives of the member companies successful load-building methods and thus it is called the Sales Promotional Committee. It consists, in addition to the committee section chairmen, of the following personnel:

John J. Burns, The Laclede Gas Light Company, St. Louis, Mo.

Robert Canniff, Standard Gas Equipment Corporation, 122 So. Michigan Avenue, Chicago, Ill.

A. F. Davey, Wisconsin Public Service Corporation, 618 North 8th Street, Sheboygan, Wis.

James P. Hanlan, Public Service Electric & Gas Company, 80 Park Place, Newark, N. J.

Jesse L. Johnson, Providence Gas Company, Providence, R. I.

J. Earl Jones, Seattle Lighting Co., Seattle, Wash.

R. L. Montgomery, Louisville Gas and Electric Company, Louisville, Kentucky.

C. A. Nash, United Light and Power Engineering & Construction Co., United Light Building, Davenport, Iowa.

Clyde H. Potter, Southern Counties Gas Company of California, 810 South Flower Street, Los Angeles, Calif.

Geo. H. Schlatter, Birmingham Gas Company, Birmingham, Alabama.

Latest A. G. A. Publication

Subjects scheduled for *The MCF Builder* follow:

February—"Refrigeration."
March—"Water Heating."
April—"Cooking."
May—"Trade and Dealer Cooperation."
June—"Merchandise Accounting."
October—"House Heating."

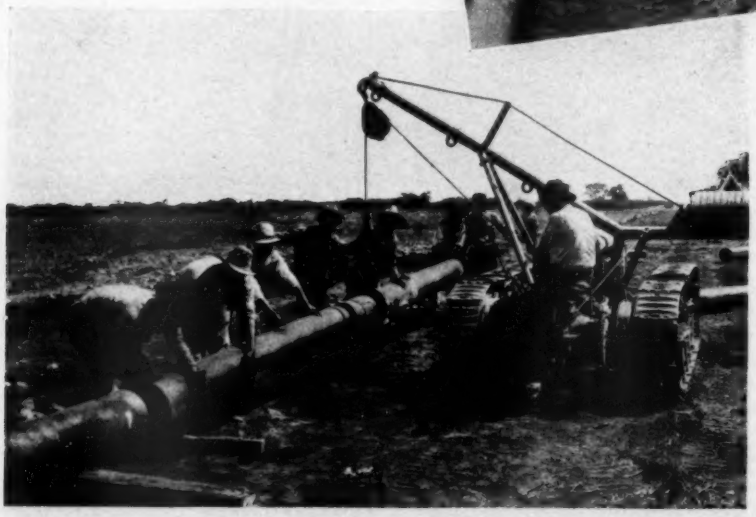
"With such a set-up there is afforded an excellent opportunity for the dissemination of good sales ideas, thus stimulating greater commercial activity."

Natural Gas Building A New Industrial Southwest

Public utility eyes are being focused particularly on the natural gas division of the industry, which is carrying out the greatest expansion in its history. Activities are widespread in the three producing areas—California, Texas-Louisiana and Pennsylvania-West Virginia. Last month, The American Gas Association MONTHLY described recent natural gas developments in the San Francisco Bay area. Herewith is presented a word picture of the enormous developments in the Texas territory. Mr. Struth, who wrote this article, is petroleum economist of "The Oil Weekly," Houston, and is regarded as an authority on matters relating to natural gas and petroleum.

IT is perhaps not generally realized that the State of Texas is capable of producing a supply of natural gas sufficient to satisfy the domestic fuel requirements of the entire United States. Some idea of the enormous potential supply of natural gas in this State alone, can be gained from the fact that the known natural gas reserves of four major producing areas within the State have been estimated to be capable of producing at least eighteen billion cubic feet of natural gas a day. At this rate, it would be possible to produce within the period of a year about 6,570,000,000,000 cu. ft. of natural gas, or sufficient to treble the present annual consumption of both natural and manufactured gas in the entire United States. Thus, if it were possible to pipe Texas natural gas into every home in the country, the supply of this fuel available would more than satisfy the domestic fuel demands of the nation.

Loop Construction on 12-inch Line South of San Antonio

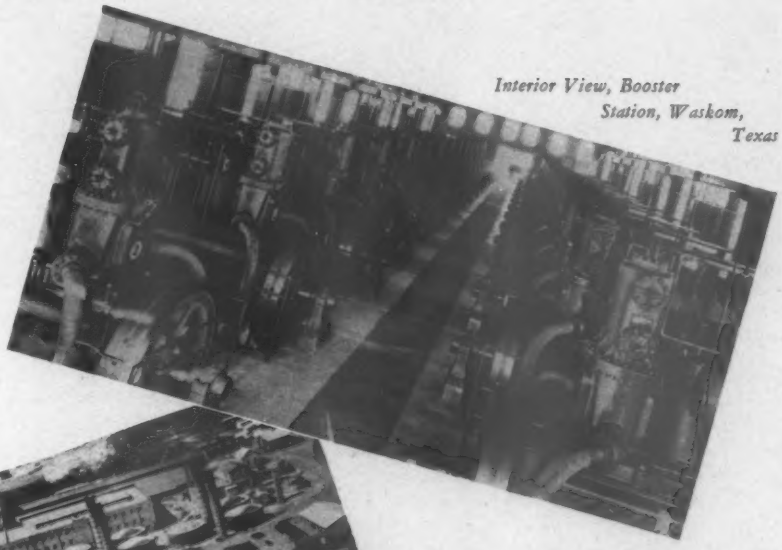


At Work on the Monterey, Mexico, Line

Estimates of natural gas production during 1929, prepared by the writer, reveal that there was produced in the United States an aggregate volume of 1,900,000,000,000 cu.ft. Of this huge total, the State of Texas produced approximately 450,000,000,000 cu.ft., or nearly 24 per cent of the production of the United States. A preliminary survey of natural gas production during last year makes it appear evident that Texas occupied first place as a producer and distributor of natural gas. Actual production data for the year 1928 show that Texas ran a close second to the State of Oklahoma; Texas producing three hundred and

By H. J. Struth

one billion, nine hundred and ninety million cubic feet while Oklahoma produced three hundred and twenty billion, eight hundred sixty-one million cubic feet. Not only does this signify that Texas leads the nation in the production of natural gas, but a comparison of the figures for the two years discloses, by the marked gain, that 1929 was a year of stupendous developments, as well. Not only did Texas lead the nation in the production of natural gas, but it also outranked all other states in the production of petroleum. Preliminary reports



Interior View, Booster Station, Waskom, Texas

San Antonio Sewer Pipe & Mfg. Co., Saspamco, Served by Natural Gas

Somerset Meter and Regulating Station Serving San Antonio

indicate that oil production of the United States during 1929 aggregated one billion, nine hundred seventeen thousand, one hundred barrels, of which Texas produced two hundred and ninety-eight million, eight hundred forty-eight thousand, one hundred and fifty barrels, or approximately 30 per cent, exceeding the totals credited to both California and Oklahoma.

That the year 1929 was one of remarkable achievements in the natural gas industry is evidenced by the completion of numerous gas pipe line projects, that are now supplying additional hundreds of communities with this ideal fuel. Long-distance pipe lines, ranging in length from 100 to 600 miles, were completed last year and are now delivering natural gas to cities and towns that were formerly considered too far removed from a source of supply. To accomplish this, required not only the expenditure of many millions of dollars but the far-sighted vision of natural gas men, combined with untiring energy and genius in order to cope with the many problems that confronted the progress of these stupendous projects. Rivers, mountains, swamps, quicksand and dense forest growths contributed chiefly to the numerous obstacles in the path of the proposed channels of natural gas transportation. Day-by-day, week-by-week and month-by-month, armies of men surged onward, hauling pipe, digging trenches, coating, laying and connecting pipe, mile after mile, until these transportation systems were completed. Few of us ever stop to realize, as we ignite the gas that heats the home and cooks our food, the many difficulties that had to be overcome in making possible this modern, necessary public utility.

The accompanying views, taken at the scene of action along the route of a number of important gas line construction jobs, built last year, present some conception of the problems encountered. Such were the scenes enacted in various sections of the United States last year; a majority of them being concerned with the piping of natural gas produced in Texas to cities and towns in Colorado, Kansas, Missouri and the interior of Mexico.

Natural gas has proven a boon to the Southwest, particularly the State of Texas, where industrial activities have expanded to a remarkable degree. With every assurance of an adequate supply of natural gas for many years to come, Texas has attracted industrial capital from every section of the United States, with the result that its cities are growing by leaps and bounds. Visitors in Houston, Dallas, Fort Worth, San Antonio, Austin, Beaumont and Port Arthur are amazed to find them seething with industrial activity, and yet to detect not the slightest appearance of the smoky at-

Monterey, Mexico, Now Using Natural Gas from Texas

mosphere that is customarily found in industrial centers. The utter absence of smoke above these cities is attributed to the universal use of natural gas. Even the oil refineries, many of the largest in the world of which are located on the outskirts of the cities of Houston and Port Arthur, use natural gas for fuel exclusively. Thus, when you hear about the abundance of sunshine in Texas you may rightfully conclude that the widespread use of natural gas in homes and factories of the State is conducive to a maximum degree of unobscured sunshine. At any rate, from an industrial standpoint, the cities of Texas are destined to rank foremost among the leading industrial centers of the United States. All of this is due to natural gas, which is not only found there in sufficient quantities to supply present and future requirements within the State, but also in quantities of a proportion that justifies its transportation to surrounding and distant states.

Not only has Texas figured prominently in the production and distribution of natural gas during 1929, but Oklahoma, California, Louisiana and a number of the Rocky Mountain states have also played a prominent part in supplying an ever-widening market with this natural resource. The discovery of an immense natural gas field in Kettleman Hills, California, resulted in the projection and completion of a natural gas line to San Francisco and Oakland during last year. Subsequently, the realization that huge quantities of natural gas are being wasted in California, in connection with the production of petroleum, has started a movement to effect the utilization of this gas, that is destined to eventually make possible the use of natural gas throughout the entire Pacific Coast area. Salt Lake City and Ogden, Utah, were given natural gas service for the first time last year through the completion of a gas line from Wyoming. St. Louis, Missouri, Denver, Colorado, New Orleans, Louisiana, Kansas City, Missouri, as well as numerous smaller cities and towns in Montana, Wyoming, Utah, Colorado, Oklahoma, Texas, Louisiana and California, are among the latest to receive natural gas service. In fact, through the completion of a gas line from the Laredo gas field, in Texas, to Monterey, Mexico, built by the United Gas Company, of Houston, the natural gas industry has become international in scope. Nor is this the limit of development in the natural gas industry; it is but the beginning of an era of progress that will undoubtedly resolve itself to continued expansion for the next several years.

A review of the development of the natural gas industry from its inception, dating back to 1860, reveals that the total production since the year 1921 exceeded the entire output of the industry prior to that year. In view of the remarkable gains recorded in production during the past eight years, it is significant to recall the predictions made in 1921, to the effect that the production of natural gas had reached its peak and would stage a rapid decline. These predictions were prompted by the fact that natural gas production in the Eastern States of Pennsylvania and West Virginia had exhibited declining tendencies, whereas the total production of the United States in 1921 recorded a decline compared with 1920 of 137 billion cubic feet. At that time, little, if any, thought was given to the possibility that natural gas existed in huge quantities in Texas. Nor was it supposed that Oklahoma, Louisiana and California would later figure so prominently as sources of supply. Subsequent prospecting for oil deposits in the Texas Panhandle revealed natural gas in undreamed of quantities that focused the attention of the natural gas industry upon this prolific source of supply. Only in recent years has the drill revealed the presence of natural gas in the several immensely productive areas from which a major portion of the country's supply is now being obtained. A survey of the potential gas supply in the four leading producing areas of the State discloses that the Panhandle region offers a potential daily supply of seven billion cubic feet; North Central Texas eight hundred million cubic feet; Laredo area eleven billion cubic feet; Houston area one hundred and seventy million cubic feet; a combined total daily potential production of more than eighteen billion cubic feet! This furnishes conclusive evidence of the enormous quantities of natural gas available in Texas, alone, and quickly

"A Friend of Industry and Servant of the Household"

WHEN natural gas reached Atlanta, Ga., on January 21, it was welcomed by the "Atlanta Journal" with these words: "There arrived in Atlanta today a friend of industry and servant of the household that may well mark an epoch in the upbuilding of the city and of the Southeast." Indiana, Ohio, Kentucky, West Virginia, Virginia, Pennsylvania and New York are in an area of exceptionally broad expansion of natural gas distribution. Baltimore, Washington, Philadelphia, Richmond and New York are among the Eastern cities which may receive natural gas before many months have passed, and several lines into Chicago have been contemplated.

dispells any apprehension that may be felt regarding the future supply.

Conservation of the nation's natural resources is necessary to safeguard the future welfare of the public. In this connection, it can be stated that the natural gas industry is doing everything in its power to prolong the usefulness of its proven sources of supply. Numerous examples of conservancy can be cited that have been, and are, reverting to the benefit of the consumer. Not only is conservancy practiced in the fields where natural gas is produced, but the industry has even gone so far as to teach consumers how to obtain greater efficiency from the utilization of gas, and also make necessary adjustments on appliances so that waste is reduced to a negligible quantity. In support of the conclusion that the public has benefitted from the efforts of the natural gas industry to eliminate waste, can be cited the fact that since 1920, the average consumption per domestic consumer has declined from 108,000 cu.ft. annually to 77,000 cu.ft. This shows that the public is obtaining greater efficiency from its metered gas consumption, at an actual annual saving in cost. Thus, while gas rates may have increased in cost per 1,000 cu.ft., the public is able to enjoy its many comforts at practically no additional cash outlay over the fuel cost of ten years ago. Then too, modern methods of producing, piping and measuring natural gas has practically eliminated unaccountable losses that would otherwise be charged to the consumer. Today, every cubic foot of natural gas pumped into distribution lines passes into consuming channels with a minimum amount of waste. Not only is the gas industry conserving the supply for the needs of the immediate future, but also for the distant future. In order to do this, the industry is pumping excess supplies of gas back into its natural underground storage, to be recovered when required for economic utilization.

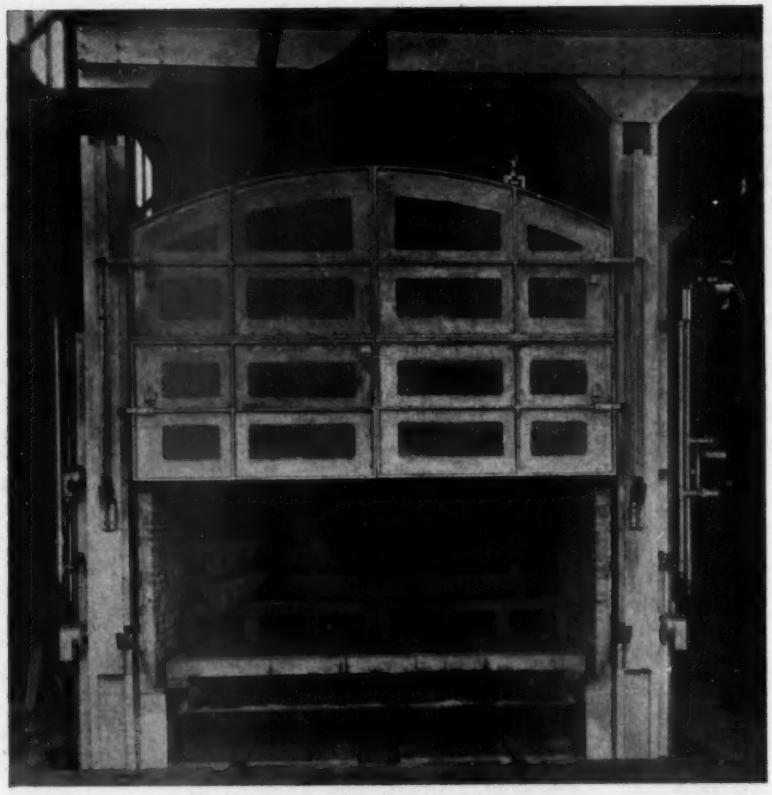
Another important development in the gas industry has been the merging of interests and problems of the natural with the manufactured gas industry. Where, formerly, these two great divisions of the industry were conducted separately, today, through the medium of the American Gas Association, the manufactured gas man and the natural gas man are brought together in a mutual solution of their problems. This has been accomplished through the merger of the Natural Gas Association of America with the American Gas Association, an organization devoted to the interests of the public and the progress of the greater gas industry of the United States. Through a nation-wide organization of departmental interests, revolving around a central research laboratory, the gas industry is able to quickly solve its numerous problems and exact precise standards upon which to soundly pursue its varied activities. This hook-up of interests redoubles the assurance of the nation upon the dependency of a future supply of gas. Already, it has been found practical and economical to mix natural gas with manufactured gas, resulting in a product of greater heating value than the latter, as well as augmenting the supply of the former. Scientific research, constantly going on within the industry, through the medium of its association, is contributing untold benefit not only to the industry itself, but to the consuming public.

Too much emphasis cannot be placed upon the important part being played in the natural gas industry by the great Southwest. To attempt to visualize the potentialities of this area as a producing center of the natural gas industry, is to venture the conjecture that, eventually, the entire United States will be using natural gas to the exclusion of all other fuels. Whether such would be possible or not makes it none the less evident that the future of this rich area is being solidly built upon the foundation of a necessarily unlimited supply of gas fuel. This invisible, yet powerful builder of industry represents a force that is really of as great magnitude as the apparently unlimited coal resources of Pennsylvania. Therefor, just as the availability of coal in Pennsylvania promoted sound industrial progress in that State, so natural gas is destined to promote a perhaps greater industrial center in the State of Texas. The axiom "You can do it better with gas," is being heeded by hundreds of industrial establishments of the country, particularly those that must necessarily depend upon an adequate, yet moderately priced, fuel. Power plants, steel mills, foundries, smelters, sugar mills, oil refineries and literally thousands of manufacturing plants of every description either now use, or contemplate using, natural gas as fuel. The constant influx of large industrial establishments in the Southwest is rapidly increasing the commercial importance of this area to the extent that the growing population statistics point conclusively to future cities in the making that will rival the metropolises of the North and East. Even within the past few years, cities that were formerly rated at less than 100,000 population now proudly boast of a population of more than 300,000—and predictions of a half million or more are freely asserted as possible within the next five to ten years.

More than 2,500 communities in the United States are now being supplied with natural gas and many more will be added during the present year. Immediately ahead are definite plans for widening the distribution facilities of the natural gas industry. These plans contemplate additional hundreds of miles of pipe lines that will carry millions of cubic feet of natural gas produced in the State of Texas to far-distant cities and towns in other states. Swiftly and surely, new and abundant supplies of natural gas are invading territory that formerly considered the possibility of its utilization as remote. Plans contemplating piping natural gas from Louisiana as far east as Atlanta, Georgia have been realized, while it is not at all improbable to believe that the future will witness the piping of this fuel to even greater distances. All of this furnishes conclusive evidence of continued future growth of this great industry that will redound to the interests of the American public. The remarkable developments that are taking place in the natural gas industry today are but the foundation of a newer and greater gas industry of tomorrow.

Hotels Like Broilers

TWELVE large hotels that have installed the new Radiant-Surface Gas Broilers have ordered additional units. These broilers, the development of which was sponsored by the Committee on Industrial Gas Research, have speeded up service and cut costs in all kitchens where they have been installed.



Looking into Gas-Fired Car Bottom Annealing Furnace with Loaded Car in Place

Foundries Turn to Gas Fuel for Annealing

By C. B. PHILLIPS

THE general tendency in the metal industry today is toward alloy steels and this trend is exerting a decided influence on the process of annealing castings. In fact, it is the opinion of some that the term annealing will eventually become obsolete and that founders will be called upon to furnish "heat treated" castings. Already these founders are demanding more modern and reliable annealing equipment, that will impart the correct grain structure to the castings and produce the physical characteristics specified by the customer.

After many trials the car-bottom type furnace became the accepted design. Coal and oil were tried and abandoned, and then for no good reason at all, electric furnaces became the style. Economic pressure, however, forced the hand of the foundry industry and gas-fired furnaces made their advent and with a startling result. It was soon proved that roughly a 35 per cent saving was made with gas over electricity and this with the latter at 1.1 cent per kwh and gas of 530 B.t.u. selling for 48 cents per 1000 cu.ft.

The economies effected included: a decreased cost for fuel; shorter heating up and holding periods; more uniform heat distribution; exact atmospheric control; and the ability to produce the proper furnace pressure and maintain same at all times automatically and continuously throughout the entire heat gradient. In addition to lowering the fuel costs, the use of this furnace increases production and cuts the labor item, while at the same time a better product results. A further increase in output with still less labor is effected by a unique material handling system.

The first of these units was installed at the plant of the Link Belt Co., Chicago, Ill., a concern that is known nationally and internationally for its conveying machinery of all types. Thousands of processes have been speeded up, simplified and cheapened through the creations of its engineering staff, by redesigning or rerouting, and with a continuous conveyor taking the place of costly and awkward hand transportation.

The Chicago plant of this concern is self contained from raw material to finished product. It makes its own steel in a two-ton, side-blower converter, with a capacity for eleven blows per day. The steel most commonly used is of the following analysis:—combined carbon, .30; silica, .35; manganese, .75; phos., .03 and sulphur, .035 per cent.

The gas-fired, car-bottom type of furnace used in this plant for annealing castings was developed, over a period of years, by the engineering and research staff of the Surface Combustion Co., Toledo, Ohio. It has a door at each end and a track running through it on which the cars of castings are pushed into and through the furnace. This furnace is 10½ ft. wide, 14 ft. long and 5 ft. from the tops of the piers to the crown of the arch. It holds one car, 10 x 14 ft., and will anneal 14,000 pounds of castings at a charge.

The walls are composed of 9 in. of firebrick and 7½ in. of insulation, backed up with a reinforced steel casing while the whole structure is tied together with double channel buckstays and tie rods located at suitable intervals along the sides, front and back. A heavy arch thrust member is incorporated, running the full length of the furnace, on each side and at the springline of the arch. The fronts are of heavy cast-iron plates, suitably ribbed, and held in place by side plates and buckstays.

The shortening of the heating periods was in part accomplished by us-

ing the standard, high-pressure gas burning equipment of the Surface Combustion Co. There are 15 burners to a side and these are staggered so that the work is heated both from the top and bottom. These burners are of two types, one being the holding burners and consist of a number of the tunnel type, manifolded to proportioning inspirators, while the others are separate, two-stage velocity burners for heating up. These latter burners are shut off when the furnace is up to temperature and thereafter the holding burners are kept operating at a low rate by means of regulators and check valves in a by-pass line.

The gross weight of the charges used in this unit vary from 10 to 14 tons and the heating cycle from 3½ to 5 hours. This compares with electric furnaces of the same type in another large foundry which require 16 hours to heat 10 tons. Should only one charge be annealed in the gas furnace a day, it would affect a saving of approximately 10 hours per heat over the electric furnace, even when using a cycle of five hours 10 minutes.

The practice at this plant is to heat the steel castings up to 1750° F., which, as stated, takes from 3½ to about 5 hours, and soaking at this temperature for another hour. The burners are then all turned off and the charge withdrawn for cooling. Iron castings are annealed at 1250° F., but instead of cooling in the air they are allowed to cool in the furnace. This cooling cycle can be accelerated to any rate by progressively opening flue dampers, more of which later.

Charging Car with Hoist and Monorail Conveyor

The temperature is automatically controlled, the equipment consisting of two sets of controllers with front dial settings, one set taking care of the upper burners on both sides and the other set the lower burners on both sides. Motor operated control valves, interconnected with thermocouples and recording pyrometers are provided, and this arrangement allows for the automatic shutting off of the main heating-up burners, when the furnace has come up to heat, after which the holding burners are controlled from the by-pass line mentioned above.

Gas Firing System on Car Bottom Annealing

The feature of two-stage inspiration applied to the high-pressure velocity burners practically eliminates the backfire, or flashback, which occurs at low rates of gas consumption, with the standard high-pressure equipment. The specific operating range for this new apparatus has a turn down of from 8 or 9 to 1. This wide range allows one burner to be used where two were required before with the old type and in applications where a wide turn down was necessary.

The infiltration of cold air from the outside is eliminated in the gas furnace because the gas and inspirated air for combustion is forced in at high-pressure thus creating a pressure in the furnace which offsets the stack suction. The flues for venting the products of combustion are located near

the tops of the piers and pass through the side walls into two common ducts running the full length of the furnace on each side and then across, close to the front of the furnace, to a common outlet or stack, which is closed with a gas cylinder operated damper.

When the main heating up burners are closed, naturally the positive furnace pressure is lowered and becomes negative because of the stack pull. To offset this the damper is closed the correct amount by the forward movement of the cylinder piston. This motion is made automatic as the piston is controlled by means of the gas pressure in the main gas line and on the furnace side of the controller and control valve. Therefore, when the gas pressure is shut off this line entirely, the valve acts to close the damper.

Atmospheric control, so necessary for scale elimination, is obtained and automatically maintained by the use of venturis or gas-air proportioning devices. With these any desired atmosphere can be had, but, of course, in this case, a slight excess of gas is used. Further than this a high degree of efficiency is assured, in that the mixture can be regulated for complete combustion, the gas being entirely consumed by the time it passes out of the combustion ports and into the heating chamber. The gas used is 530 B.t.u. and is delivered to the plant at from 4 to 6 inches water pressure, but this pressure is raised to 10 pounds by a reciprocating compressor.

Localization of heat, in spots or strata, has always been a factor of some concern in periodic furnaces regardless of the fuel employed. This has been entirely overcome in this new unit by means of the positive recirculation of the hot products of combustion together with the system of staggering the burners so that they fire from both above and below. Furthermore, alloy steel frames with light holes rest on the car top and the work is piled on these and in such a manner that spaces between the individual pieces are left. As the lower bank of burners fire opposite these light holes, the heat is circulated and recirculated throughout the furnace and over every square inch of the surfaces of the castings being treated. As the combustible gas-air mixture is forced through the burners under pressure, the circulation is positive, complete and continuous. This is the only comprehensive method by which absolute uniformity of heat distribution, and at all times, is assured.

The car tops form the hearth and thus divides the furnace into two parts, the upper which is the heating chamber and the lower for the trucks to operate in. A sand seal is provided on each side and end of the car which prevents heat from leaking down through while ports in the side walls of the furnace, and below the car top, let in cold air which keeps the wheels, truck and frame cool.

Sealing the heating chamber from the outside cold air is accomplished by fitting the doors at each end into sand seals on the floor of the car. These doors are of cast-iron ribbed construction, lined with insulating concrete and are motor operated. Sheave wheels and counter weights are provided, the sheave wheels and brackets being mounted on brackets on structural steel members over the doors. The car tops are constructed of heavy steel members and lined with 5 in. of firebrick and 2½ in. of insulation. The brickwork is corbelled over to protect the steel frame of the car from the heat.

The car moving mechanism consists of an air winch and an endless steel cable passing through a recess in the floor and through the center of the furnace and is suspended on a sheave at the opposite end. Chain rings are fastened to this cable and these engage hooks on the car. There is a hook at each end of the car so that it can be pulled either way to be lined up with the sand seals.

When annealing castings at this plant a continuous cycle is used, and, in order to shorten the charging and discharging periods, two cars were fastened together, permanently, with a spacer bar. When the first car charge has been annealed, the furnace doors are raised and as the car is withdrawn, the other, which has been loaded in the meantime, is pulled in. The doors are then lowered and the heating up process starts up again.

This operation of charging and discharging requires less than a minute and during this time the temperature drops from 1750 to approximately 1700° F. Previous to this innovation, from six to ten minutes were necessary and with a temperature drop of 850° F. This hooking of the two cars together, reduced the heating period materially and affected a considerable reduction in fuel consumption. An overhead monorail system with two hoists and serving both ends of this furnace makes it possible to load or unload at either or both ends.

Formerly this company used an oil-fired furnace and bought oil at $.046 per gallon, delivered in tank cars. Figuring the cost of unloading, operating and maintaining carrying lines and auxiliary equipment, together with oven maintenance it arrived at the following costs:

Oil per gallon	$.046
Unloading per gallon	.0026
Carrying lines	.0063
Low-pressure air	.0200
Oil at 40-lb. pressure	.0110
Maintenance on oven	.0120
Total	$.0979

An exhaustive report was made on the annealing situation in which were detailed all of the weaknesses of oil-fired furnaces as against the strong points of the gas-fired unit together with the fuel costs, etc., and it was this report that convinced the management that the latter type was superior.

Electric furnaces were considered but the points in their disfavor were overwhelming. It was found by comparison that the gas furnace would anneal two charges to every one treated in an electric. The energy consumption of two electrics considered were 300 kwh and 315 kwh respectively, as against a fuel use of 4800 cu.ft. of gas per ton of work. Using varying rates the comparative fuel and energy costs of annealing would be as follows:—

A Milwaukee Steel Foundry

Electric Rate	*Consumption*	*Cost Per Ton*
$0.02 per kwh	315	$6.30
.015	315	4.725
.014	315	4.410
.013	315	4.095
.012	315	3.78
.011	315	3.465
.010	315	3.15
.0095	315	2.9925
.0090	315	2.835
.0085	315	2.68
.0080	315	2.52

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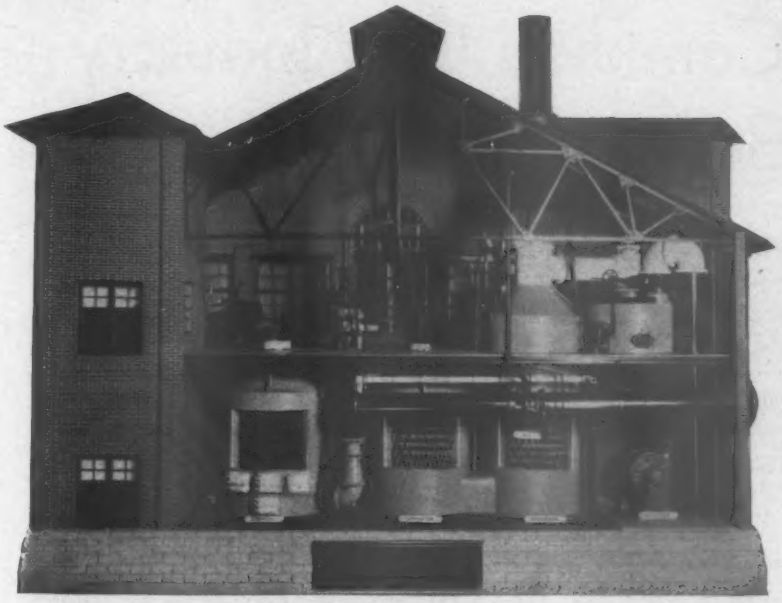

Scale model of U. G. I. 11-ft. carburetted water gas set and section of generator house of the Brooklyn Borough Gas Company, Coney Island, N. Y. It was built by P. B. Bass, Brooklyn, N. Y.

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Gas Plant Model May Go to National Museum

THE Smithsonian Institution, United States National Museum, Washington, D. C., wants the model of the gas plant, executed by Philip B. Bass for the Brooklyn Borough Gas Company, as a unit of its industrial exhibit.

Carl W. Mitman, curator of the divisions of mineral and mechanical technology of the institution, declared in a letter to Miss Mary E. Dillon, president of the Brooklyn Borough Gas Company, that "The addition of this model will bring our gas manufacturing exhibit up to date."

Mr. Mitman's letter under date of Jan. 4, 1930, to Miss Dillon follows:

"In the exhibit of the Gas Association at the Power Show in New York last month, was a model of a U. G. I. 11-foot carburetted water gas set and section of the generator house of the Brooklyn Borough Gas Company, Coney Island, N. Y., that appealed to me as a possible addition to the collections of the U. S. National Museum.

"Among our industrial exhibits we have several models and relief plaques that illustrate the methods of manufacturing gas, but none of these show present day practice as completely or attractively as does the above model. The addition of this model would bring our gas manufacturing exhibit up to date.

"I am writing to ask if you would consider the question of presenting the model to the museum."

Miss Dillon is uncertain about turning the model over to the Museum. Answering Mr. Mitman's inquiry, she said:

"We are pleased and complimented at your desire to have our model of the 11-foot carburetted water gas set in your collection at the National Museum.

"At present we are using it for education and demonstration purposes among our consumers and students of various high schools. However, when it has served its usefulness in this direction, we shall be glad to consider your suggestion."

The model is said to be the only one of its kind in the country. The idea of having it built was conceived by Miss Dillon.

This model is similar in design and construction to the larger apparatus, which is today supplying gas to 75 per cent of the cities in the United States.

The carburetted water gas is manufactured in three round vessels, the generator, the carburetter and the superheater.

About three fourths of the gas is generated or manufactured in the generator which is lined with fire brick. The generator is connected with a similarly shaped cylinder called the carburetter. This part also is lined with fire brick, and is almost filled with layers of bricks placed criss-cross, thus forming a honeycomb arrangement in which oil is gasified to enrich the gas made in the generator. The carburetter is connected to a third vessel, also honey-combed with brick. This is called the superheater and is used to

(Continued on page 137)

Canadian Gas Industry Sets New Records

By ARTHUR HEWITT
General Manager, Consumers' Gas Company of Toronto, Canada

Mr. Hewitt

DURING the past year the production of manufactured gas by gas and coke companies in Canada reached the enormous figure of over thirty-six billion cu.ft. As a large proportion of the gas made by the coke companies was used at the place of manufacture to heat the coking ovens, or used in their associated metallurgical works, the quantity so used must be ignored in reviewing the progress of the gas industry with respect to the use of gas by the public for domestic and industrial purposes.

The total quantity of gas used for these purposes in Canada last year exceeded sixteen billion cubic feet, and the number of consumers served was over 500,000.

During the past few years the gas industry in Canada has made remarkable progress. In the last ten years the annual sale of gas has increased over 80 per cent, while the average annual increase in the consumption of gas during the last three years has amounted to 1,000 million cubic feet.

To keep pace with the increasing annual demand, additional investment in manufacturing plant, distribution system, etc., must be made, which would amount to approximately $4,000,000 per year. This huge expenditure for new plant in each year, combined with the normal rate of reconstruction of old plant, insures that for the most part the methods of production in use in the Canadian gas industry today are modern and incorporate the many improvements in design and efficiency that have been effected in recent years.

The major portion of the huge volume of gas sold in Canada last year was consumed in domestic appliances. At one time gas was used in the home solely for the purpose of lighting. The volume of gas now used for this purpose is but a negligible part of the total, and while it is true that electricity has largely displaced gas for lighting, yet the expansion in the use of gas in the home has been extraordinary. It has been said that for industries, as for individuals, life is a continuous series of adjustments to changing conditions, and success depends upon the ability to make these adjustments with the minimum of delay and loss. The gas industry has not only adapted itself to the rapid social and economic changes which characterize our domestic and industrial life, but has gathered strength in the process, and at the present time is facing great opportunities for growth and further expansion.

In addition to the domestic use of gas for cooking and procuring hot water, there are other important uses to which gas is being put in the home. In constantly growing numbers, the better class of homes are being equipped to use gas as fuel, because of its general superiority. House heating by gas has many distinct advantages, particularly with respect to economy of space occupied by the appliance, absence of fuel storage, cleanliness due to elimination of ashes, ease with which the flow of fuel to the furnace may be controlled and automatic control of temperature.

The gas-fired refrigerator, which has no moving parts and which therefore is noiseless, is a very successful appliance. The past year has witnessed a notable advance in the development of gas refrigeration. This is an important business for the gas industry, offering, as it does, possibilities of a compensating load, off-setting the lack of heating business in the summer time, and the gas refrigerator sales already made indicate a great future in this line for the gas industry.

Other domestic gas appliances being used are space heaters, incinerators, garage heaters, gas-fired laundry driers, etc. It has been remarked that if the public were to realize fully the advantage of gas in the home, gas would be much more universally used.

The growth in the use of gas in industry during the past five years is without equal. In each year large increases are reported in the volume of gas used by industrial concerns, who find in gas a fuel, not only superior to that formerly used, but when all factors are considered one that is actually cheaper. Not only in Canada but in the industrial centres all over America, in Great Britain and in Europe, the many advantages of gas in industrial heating operations are recognized, and it is being used for the heat treatment of materials ranging all the way from the most delicate to the hardiest and heaviest.

There are many uses for gas and, according to one authority, some 20,000 new uses have been developed in the past fifteen years. There are some industries in Canada in which gas, because of its ease in handling, its steady and inexhaustible supply and the possibilities of automatic temperature control, is readily adaptable to the heating operations required. Some of these industrial concerns use as much gas as 1,000 average homes.

All this development in the use of gas in industry places a great responsibility upon the gas industry to see that appliances to be used in industrial heating operations are properly designed and developed to the highest point of operating efficiency.

In this connection the Canadian Gas Association through affiliation with the American Gas Association takes its part in a well-planned research program, the purpose of which is the development of industrial gas equipment in new fields, or in fields where penetration in the past has been in-

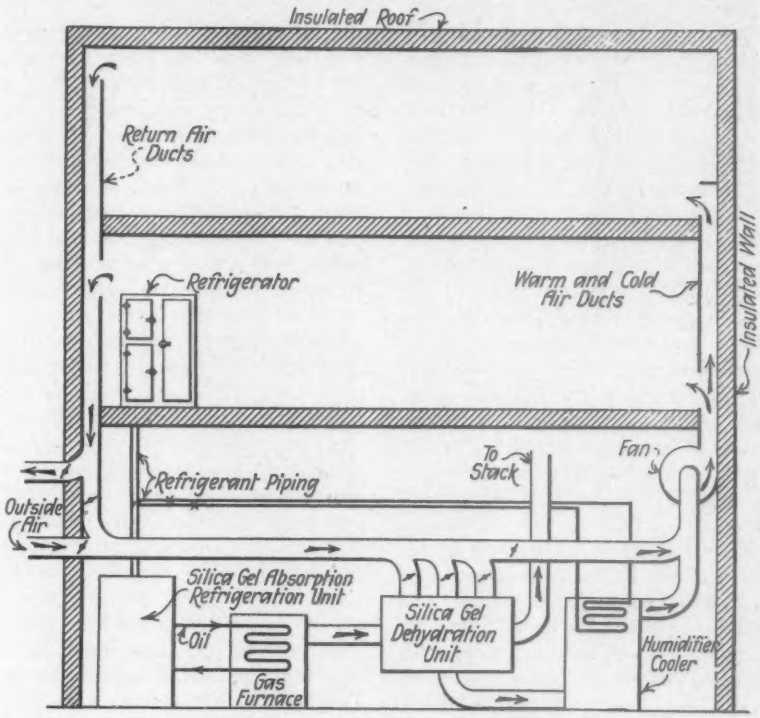
(Continued on page 137)

Year 'Round Air Conditioning

A Probable Development in the Home Service Rendered by Gas

Mr. Milener

By EUGENE D. MILENER
Industrial Research Representative of the American Gas Association



Diagrammatic View of Gas-Fired Cooling System

WHEN looking at the subject of house cooling as it will be practiced in residences during the next decade, the gas industry visualizes this as a logical development in its plans to furnish the major energy requirements of the American home. This application of energy is simply one more step in the growth of the American home and this progress will continue to take place until the home is equipped with every possible comfort and every possible labor saver which can be produced by mechanical forces. And this energy will be supplied automatically from sources outside the house.

House cooling is simply a service depending upon energy to change the humidity and temperature of the air supplied to the various rooms, the same as properly heating a house is simply changing the temperature and humidity. In the one case a definite number of B.t.u.'s—energy—is required to raise the temperature and absorb moisture for humidification and in the case of cooling a definite number of B.t.u.'s (although they are used differently) are required to bring down the temperature of the air and remove the excess moisture that it contains.

Looked at from this angle it is well to consider the present status of the various factors that have a bearing on the ultimate development and public acceptance of house cooling with gas; the trends these factors are taking and the position the whole movement is likely to occupy the latter part of this decade. The factors affecting the growth of gas house cooling can be roughly placed into two general classes—the social, financial and economic factors, and the technical research and engineering factors. In the first class are such things as public acceptance from the viewpoint of comfort, luxury and health, changing living habits, financial standing of users, construction of buildings, etc. In the second class may be included the necessity for development of cooling and dehumidifying equipment and especially the media that will be used for these operations, control apparatus, safety devices, etc.

Every trend in the modern high-grade home is very definitely lending itself to preparing the way for house cooling. The public has put its stamp of approval on every worthwhile improvement in the home. It has accepted comfort and luxury as the birthright of everyone, and places no restrictions around those who shall share in them. Anything that helps to better the health of individuals or of groups of individuals is accepted without question. The individual home owners have in large numbers found ways of financing every other comfort that has been produced, and large numbers of the public will be able to finance house cooling. Building construction is already well advanced in applying wall and ceiling insulation. Weather stripping is accepted everywhere and storm windows in some sections are used as a matter of course. And last but not least, automatic gas house heating has been introduced into thousands of homes where the owners are daily experiencing

the thrill of securing uniform winter air conditioning from controlled heat delivered noiselessly and efficiently through gas pipes underground. This "winter air conditioning" is at the beck and call of a little thermostat that hangs on the wall or rests on a table. The owner only sees this once a week when he winds the clock; but now with self-winding clocks even that simple ritual has been done away with.

So it can be seen that the development of gas house cooling is in line with what people want, what they expect and what they will be demanding within a few years.

The gas industry believes that it is in a position to ultimately play a prominent part in supplying the public with this service in much the same way that it now supplies the home with all the other services that require large amounts of energy. It is estimated that the average modern home of about 8 rooms requires about 210,000,000 B.t.u. a year in the form of gas for house heating, cooking, water heating, refrigeration, etc. This compares with about 2,000,000 B.t.u. a year in all other forms for lighting, household power and other miscellaneous uses. It has also been estimated that such a house would require about 21,000,000 B.t.u. a year for house cooling. This would be but a small percentage increase in the gas used and can be delivered without one cent additional investment on the part of the gas company. As all gas used for house cooling is off-peak gas, it will be available at very attractive off-peak rates when its use becomes general. On the other hand, the automatic delivery of this large amount of energy in any other form would require the investment of immense sums, handicapping the house cooling system with burdensome fixed charges from the beginning.

This brings the subject of house cooling with gas down to a question of efficiently utilizing the automatically delivered cheap energy that is already available in every urban home.

The technique of house cooling with gas is rapidly becoming understood. Research is now under way to determine the fundamental factors with greater accuracy and to develop mechanical equipment and cooling media that will be reliable and can be operated simply. Research of this character has the endorsement of the American Gas Association acting for the gas industry, and the Executive Board of that organization has instructed the Committee on Industrial Gas Research to lend every encouragement to its energetic prosecution.

At the present time progress in this field has been based largely on work that is being done in commercial air conditioning. It should be borne in mind that cooling, that is, the reduction in sensible heat of the air, will not in itself condition air satisfactorily for summer conditions. Dehumidification, or the removal of moisture, is of equal or greater importance. The progress made by gas air conditioning up to this time is attributable to the fact that this process can be done directly by energy utilized in the form of heat. Installations using gas as the source of energy for air conditioning have been made in many industries, and some have been in service long enough to show the fundamental soundness and great economy where the cycle is operated by gas heat. These successful factory installations have been supplemented by a large theater installation. The cooling of this theater with gas is just one of the many steps that will be taken to ultimately give the householder a gas cooling system that will supplement and tie in with his gas heating system.

The greatest progress in gas air conditioning using gas burners as the source of energy seems to have been made using silica-gel as the absorbing medium. Its tremendous absorbing qualities, its freedom from chemical reactions and its ability to be rapidly heated with a gas flame makes possible through its use either direct air conditioning, or air conditioning from refrigeration produced by it. Or there may be any combination of the two.

Just what form the gas cooling equipment will ultimately take cannot be stated now. All authorities seem to agree, however, that the distribution system through the house will be by means of air ducts with positive circulation. This lends itself nicely to combination with an automatic warm air gas heating system or winter air conditioner. One such combination system that has been suggested is shown in the diagram herewith. It shows how it is possible, with one gas burner, using silica-gel dehydration and refrigeration units and an ordinary air washer, to completely air-condition the home throughout the year. Refrigerators of any size can also be cooled from the same gas burner.

The furnace, as shown, supplies the heat necessary for the refrigeration unit by means of circulating oil. The combustion gases from the furnace pass around the gel containers in the dehydration unit, thus heating the gel. A portion of the recirculated and fresh air passes through the hot gel which serves as a heater during winter operation. For summer operation, this air will pass through only those sections of the dehydration unit which have been previously activated or heated. The unit will then serve to dehydrate rather than to heat. Household refrigeration and ice-making can be operated from the same gel units.

Other plans have been proposed that depend entirely upon the air being dehydrated by a gas absorption refrigeration machine and cooled down to any desired point by rehydration. Ultimately research will no doubt develop several systems, and experience gained from practical operating conditions will determine which system will best meet any given set of conditions.

That year round automatic air conditioning will be somewhat commonplace in the better class of homes in less than ten years from now is almost a surety. Automatic heating and winter conditioning by gas is now the accepted standard. The next step,—dehydrating and cooling,—is now entering the research and development stage. Technically, some of the fundamentals,—such as ability to cool and to dehydrate directly,—strongly favor the use of gas. On top of this the economics of the situation will demand that full use be made of this cheapest source of energy continuously available in the home.

Reprinted from Heating and Ventilating.

A new industrial use for natural gas which has just been developed in the Southwest is its application to railway locomotives during the pre-heating period, experimentation and proving of which has been carried out by Frank Jackson, industrial engineer of the Fort Worth (Tex.) Gas Company.

Personal and Otherwise

Mr. Chenoweth

John P. Chenoweth, formerly of the Citizens Gas Company of Indianapolis, and for the past twelve years with the United Fuel Gas Company of Charleston, West Virginia, has been promoted to special representative for the Charleston operating group of properties of the Columbia System.

William G. Sterrett, who has had broad experience in public utility accounting and management and formerly identified with the American Gas Company and the Philadelphia Suburban Gas and Electric Company, has been appointed division manager, Eastern Division, Suburban Counties area of the Philadelphia Electric Company.

Edgar G. Hill and John Barberey, who have been in charge of the construction and establishment of the natural gas industry in Colorado, have been recalled from Colorado Springs. Mr. Hill is going to Birmingham, Ala., where he will take the office of general manager of the Southern Natural Gas Company, while Mr. Barberey will return to the Standard Oil Company offices in New York City.

E. E. LeVan and J. H. Maguire have been appointed general sales manager and work manager, respectively, of the Haynes Stellite Company, New York City.

A. J. Berta, formerly assistant treasurer of the North American Light and Power Company and its subsidiaries, recently was elected treasurer of that company, succeeding P. L. Smith.

Francis I. duPont, member of the Eastern family of capitalists, was elected a director of the Missouri-Kansas Pipe Line Company at a recent meeting in Chicago.

Geoffrey D. Yeaton, formerly of the Boston office of the Bryant Heater & Manufacturing Co., will hereafter be assistant to J. M. Traugott, Atlantic District Sales Manager of the Bryant company, with headquarters at Philadelphia.

Edward L. Wilder has resigned as manager of the industrial sales department, Rochester Gas & Electric Corporation, and has joined the J. G. White Management Corporation of New York City.

Mr. Weymouth

Thomas R. Weymouth, president of the Oklahoma Natural Gas Corporation, has accepted an invitation of Johns Hopkins University of Baltimore to lecture before the School of Engineering on Tuesday, March 4, at 4:15 p.m. The subject of the address will be "Some Engineering Aspects of the Natural Gas Industry." Mr. Weymouth will represent the Committee on Cooperation with Educational Institutions of the American Gas Association in his appearance at Johns Hopkins.

William H. Insley, a director of the Citizens Gas Company, Indianapolis, has been appointed president of the Indianapolis Community Fund.

Caldwell B. Spates, of Yonkers, N. Y., was elected president of the Westchester Gas Society at a recent meeting.

Michael F. Moran was elected president of the Lynn Gas & Electric Company Quarter Century club for the fifth time recently.

Mr. Blackwell

H. C. Blackwell was elected vice-president of the Columbia Gas and Electric Corporation and appointed general manager of the Columbia Engineering and Management Corporation by the board of directors last month.

After his graduation from Purdue University, in 1902, Mr. Blackwell started his engineering career in Cincinnati and continued to rise through successive departments and steady promotion from a draftsman in Pittsburgh, engineering duties with the Wabash Railroad, construction and engineering of electric railway lines with J. G. White, operator of an electric street railway system in Illinois, from engineer to vice-president of The Peoples Light Company, of Davenport, Iowa, and gas engineer for United Light & Railways Company, thence vice-president and general manager of Kansas City Power & Light Company to vice-president and general manager of the Union Gas & Electric Company, Cincinnati, in 1924, a Columbia System property, and later was elected president of the Cincinnati operating group of companies.

N. C. McGowen, president of the Louisiana Gas and Fuel Company and head of the Palmer Corporation of Louisiana, was recently elected a director of the First National Bank of Shreveport, La.

Robert B. Ingle, who was transferred from Greeley, Colo., to Bangor, Me., to take the office of manager of the Bangor Gas Light Co., has been elected vice-president and general manager of the company.

Henry Kahn was elected vice-chairman of the board of the Citizens Gas Company, Indianapolis, Ind., at the annual meeting of the board of trustees.

J. V. Santry has been appointed head of the Combustion Engineering Corporation to succeed Colonel H. D. Savage, who is assisting the receivers.

Frank Cook, formerly foreman and engineer of the Hutchinson Gas Company, has been transferred to the Fort Scott, Kan., property, where he will be superintendent of Union Public Service Company.

Howard A. Ackerman, of the engineering department, was elected president of the Hartford Gas Company Employees' Association at a recent meeting.

W. W. Freeman Resigns from Columbia Gas

W. W. FREEMAN has resigned as vice-president of the Columbia Gas & Electric Corporation, also as director and official of various Columbia company subsidiaries, and has accepted election as chairman of the Board of Directors of the Intercontinents Power Company, which is a Delaware Corporation owning and operating a substantial group of electric light and power companies in South America, located in Argentine, Chile and Brazil.

Mr. Freeman

Since the organization of the Intercontinents Power Company, in 1928, more than one hundred such properties have been acquired, and the program of the company is to develop and extend such holdings.

Mr. Freeman's headquarters will be in New York. He will shortly visit the South American main offices of the company in Buenos Aires, and make a survey of operations before returning to New York.

He is a member of the Executive Board of the American Gas Association and also of important committees, including the Committee on Executive Conference.

Weldon Winans Freeman was born in Exeter, Ontario, Canada, June 8, 1872, and received his education in grammar school and high school in Listowel, Ontario. He began his business career in 1889 in the office of the general manager of the Edison Electric Illuminating Company, of Brooklyn, N. Y., and from this beginning advanced steadily to vice-president and general manager. He resigned from this concern in 1912 to become vice-president and general manager of the Alabama Power Company. After serving in this capacity for over a year, he resigned late in 1913 to become president of the Union Gas & Electric Company, Cincinnati, Ohio, at the same time being appointed a vice-president of the Columbia Gas & Electric Company, of which the Union Gas & Electric Company is a major operating unit.

Mr. Freeman is a member of the Metropolitan Club, the Lotus Club, the Engineers Club, the Lawyers Club, the Canadian Club, the Automobile Club of America and the National Arts Club, all of New York City; the Engineers Country Club, Roslyn, L. I., the Rockwood Hall Country Club, Tarrytown, N. Y., The Beauvoir Club, of Montgomery, Ala., and the Athletic Club, Columbus, Ohio. He is also a member of the Camargo Club, the Cincinnati Country Club, the Queen City Club, and the Cincinnati Club, all of Cincinnati, Ohio.

Mr. Freeman is a past president of the National Electric Light Association, and of the Association of Edison Illuminating Companies, and for the past eight years has been president of the Society for Electrical Development, which society, on the occasion of the presentation of the James H. McGraw Award for cooperation, gave a dinner in his honor on the evening of January 9, 1928.

F. W. Seymour Heads Lowell Gas Co.

Fred W. Seymour of Battle Creek, Mich., is the new president of the Lowell, Mass., Gas Light Co., succeeding Austin K. Chadwick of Lowell, who resigned. Roy A. Ziegler, of Lowell, has been elevated from the general managership to vice-president and there have been several changes in the board of directors.

Mr. Seymour

Among the directors who have resigned are Harry H. Hunt, executive vice-president of Stone & Webster, and L. P. Hallowell of Lee, Higginson & Co., both of whom were representatives on the board of Stone & Webster Co. When the latter company sold out its Lowell holdings these men resigned. Mr. Ziegler will take the place of Mr. Hunt on the board and Albert Vermeer, secretary and treasurer of the American Commonwealths Power Associates, succeeds Mr. Hallowell.

Mr. Seymour is president of the American Gas & Power Co. and of the National Gas & Electric Corp., and an executive of various other affiliates of the American Commonwealths organization in Birmingham and Minneapolis.

Three Lowell men are members of the seven on the board of directors. They are James C. Reilly, Arthur C. Spaulding and Roy A. Zeigler. The other members are Frank T. Hulzwig of New York City, President Seymour, Albert Vermeer, New York City, and Philip L. Spaulding of Boston.

Whammond Leader of Sales Council

Mr. Whammond

AT the annual meeting of the Mid-West Industrial Gas Sales Council, held January 17 in Chicago, James W. Whammond of The Peoples Gas Light & Coke Company was elected chairman.

Following is the list of officers and committees who were elected to carry on the work of the Council for this year:

James W. Whammond, chairman; G. W. Akerlow, vice-chairman, and W. M. Riach, Jr., secretary.

Program Committee—C. H. Lekberg, chairman; G. H. Head and S. B. Lee.

Publicity Committee—J. J. Dignan, chairman; G. A. Uhlmeyer and W. H. Miller.

Butane Committee—A. A. Schuetz, chairman; C. F. Henness, C. G. Holmes and E. L. Gates.

An amendment to the constitution was submitted providing for the creation of an Advisory Committee. The members of this committee will be composed of ex-chairmen of the organization.

The Mid-West Industrial Gas Sales Council is now in its fourth year and is growing larger and exerting more influence in industrial gas sales each year.

D. A. Hulcy Steps Up

D. A. Hulcy, formerly assistant comptroller of the Lone Star Gas Company, has been appointed assistant to L. B. Denning, president of the company. C. P. Read, traveling auditor, has been made assistant comptroller, succeeding Mr. Hulcy, January, 1920, he entered the employ of the Lone Star Gas Company in the accounting department. Prior to his appointment as chief clerk of the accounting department in January, 1924, Mr. Hulcy held every job in the department through distribution to head of the producing department.

SINGING IN THE LUNCH HOUR

Officials of The Consolidated Gas Company of New York and affiliated gas and electric companies have noted a tendency of employees to gather for community singing upon leaving the company's cafeteria during the noon hour. As a result, the gas company has made special provision for this activity, including use of an auditorium seating 400 persons. Between four and five hundred employees join in the song fest, which is held twice a week, accompanied by an employee orchestra, under the volunteer direction of George Hemmer, of the company's statistical department.

George B. Shawn Joins Boiler Company

Mr. Shawn

GEORGE B. SHAWN, for approximately four and one-half years Supervisor of the American Gas Association Testing Laboratory, resigned February 1 to take charge of the engineering and development work of the B-Line Boiler Company, Cleveland, Ohio.

Mr. Shawn came to the American Gas Association from the United States Bureau of Standards where he spent about six years as Associate Gas Engineer.

While at the Bureau, he assisted in the research work preceding the publication of Technologic Paper, No. 193, entitled, "Design of Atmospheric Burners."

This bulletin has been used quite generally by appliance manufacturers as a textbook since its completion and is regarded among appliance engineers as one of the most complete treatises ever published on such subjects.

During the past two years, Mr. Shawn had been directly in charge of the research work at the Association's Laboratory. During this time several particularly valuable contributions have been made to the industry's literature on the subjects of mixed gases, propane and butane research and various other subjects relating to gas appliance performance.

All members of the Laboratory staff as well as members of Association Headquarters wish Mr. Shawn the best of success in his new position.

John B. Klumpp Appointed on City Commission

Mr. Klumpp

JOHN B. KLUMPP, of Philadelphia, has been appointed engineer to the Municipal Gas Commission to succeed William H. Blauvelt, resigned, according to announcement made by Samuel M. Vauclain, chairman of the commission. The appointment became effective February 1.

Mr. Klumpp has been an outstanding figure in the gas industry for many years and has held a number of important posts in the American Gas Association, including the presidency. Following his graduation from Stevens Institute of Technoloy in 1894, he began work in the engineering department of The United Gas Improvement Company. From 1904 to 1919 he was in charge of all examinations and reports made by U.G.I. on both gas and electric properties. In 1924 he was made assistant general manager of the company and shortly afterward was elected a vice-president. He resigned on May 1, 1929, to enter the consulting engineering field, specializing in gas service development.

During his long association with U.G.I., Mr. Klumpp frequently served as expert before various state public service commissions in property valuation and rate cases.

The Municipal Gas Commission, in addition to Mr. Vauclain, is composed of Murtha P. Quinn, the city's representative, and Conrad N. Lauer, president, The Philadelphia Gas Works Company, who represents the gas company. It establishes under the terms of the lease agreement between the City of Philadelphia and U.G.I. the rates that shall be charged for gas service in the city, the rates being determined on a cost-of-service basis.

Herman Russell Named Rochester Gas Head

Mr. Russell

HERMAN RUSSELL, vice-president of the Rochester Gas and Electric Corporation of the Associated System, has been named president of that organization to succeed the late Robert M. Searle.

Mr. Russell first became associated with the Rochester company in 1905 when he was appointed assistant superintendent of the gas works of the Rochester Railway and Light Company, the nucleus of the present company.

In 1906, he became superintendent of the gas manufacturing department of the company. With the growth of the organization and the need for expansion in the management, Mr. Russell was appointed assistant general manager in 1914, and from this position was promoted to general manager. He became vice-president in 1922 and six months later was elected to the board of directors of the Rochester Gas and Electric Corporation.

Mr. Russell was born in 1878 in Manistee, Michigan, which at that time was a center in the lumber camps of northern Michigan. He attended the public schools of Manistee and entered the University of Michigan at Ann Arbor when he was sixteen. Following his graduation he took up post-graduate work in chemistry and gas engineering and received his master's degree in 1900.

After leaving the university Mr. Russell entered the employ of the Detroit Gas Company and in 1902 he was appointed assistant superintendent. Later he became superintendent of the gas manufacturing department of the San Francisco Gas and Electric Company.

Affiliated Association Activities

Illinois Gas Association

THE annual convention of the three Illinois utility associations will be held in Springfield, Illinois, on March 19 and 20. On the first morning the three associations will have a joint meeting.

In the afternoon, the Illinois Gas Association will hold a separate session for which the following interesting program has been arranged by the Program Committee headed by H. T. East: Address by President E. E. Lungren; "The Gas Industry," by B. J. Mullaney, president of the American Gas Association; "Gas Refrigeration," by Nils T. Sellman, of The Consolidated Gas Company of New York; "Economics of the Gas Industry," by W. M. Willett, of the Western United Gas & Electric Company, and "Recent Developments in Gas House Heating," by H. B. Johns, of The Peoples Gas Light & Coke Company.

An innovation has been planned for the second day in the form of a joint conference of the agricultural and utility interests of Illinois. Agriculture is the basic industry of the State and much attention is being paid to the rural aspects of gas and electric distribution. It is believed the conference will lead toward a better understanding of the problems of the two industries.

Pennsylvania Gas Association

PLANS for the annual convention of the Pennsylvania Gas Association, which will be held at Galen Hall, Wernersville, Pa., on April 29, 30 and May 1 are about completed, according to Warren A. Norris, president of the association.

"The program is the most elaborate one ever undertaken by the P. G. A.," Mr. Norris said, "and will reflect much credit on the council. It will be announced shortly, and it is hoped that the members will respond to it with a record attendance."

Empire State Gas & Electric Association

AT a recent meeting of the executive committee of the Empire State Gas & Electric Association it was decided to hold the annual meeting at Saranac Inn on September 18 and 19, 1930.

The Gas Section of the Empire State Gas and Electric Association will meet at Elmira, at the Hotel Mark Twain, on March 27 and 28. R. Van Vliet of the New York and Richmond Gas Company, Staten Island, general chairman, will preside.

The session Thursday morning will be opened with an address by F. H. Hill, vice-president and general manager of the Elmira Water, Light and Railroad Company. The program will include discussion of consumers meters in special reference to locked meter periods, bakelite valves, semi-chrome leathers, indexing to zero, and meter records with H. A. Anderson in charge. Large volume industrial meter tests will be handled with two papers in charge of C. C. Atwood, of The Brooklyn Union Gas Co.

New developments in materials and methods for gas distribution will be submitted by Erick Larson, of the Long Island Lighting Company, and H. L. Strong of the Elmira Water, Light & Railroad Co., will read a paper on hot water holder heating economics. A symposium on shop practice will be in charge of H. E. Merrill, of the Republic Light, Heat & Power Co., Tonawanda. Discussion will cover refrigeration service policies, house heating service policies, dust troubles in services and meters, and other shop problems.

The second morning session will be opened with an address by W. J. Welsh, president, Empire State Gas & Electric Association. A report of a joint committee on preparation and sale of domestic coke will be read by John O'Malley, of the Empire Gas & Electric Co., Geneva. The Water Gas Committee, under O. H. Smith, of The Consolidated Gas Company, will present two speakers, one on future heavy gas oils, and another on evaluation of gas oils.

Other papers will include liquified gases and experiments with purging mains and equipment by R. E. Kruger, of the Rochester Gas & Electric Corporation.

A discussion of accident prevention measures in the gas industry will be submitted by a member of the Accident Prevention Section.

New Jersey Gas Association

THE annual convention of the New Jersey Gas Association will be held at the Hotel Monterey, Asbury Park, New Jersey, on April 25.

The association this year is organized into sections similar to the American Gas Association, and the diversified and interesting program that is being arranged for this convention will attempt to present to the members some of the national association problems as they affect the interests of the gas industry in New Jersey.

More than 400 gas men of New Jersey are expected to attend this one-day annual meeting which promises to climax a most successful year under the leadership of President R. A. Koehler.

Missouri Association of Public Utilities

THE executive committee, at a recent meeting, arranged to hold the convention of the Missouri Association of Public Utilities in Springfield, Mo., on May 1, 2 and 3, 1930.

Wisconsin Utilities Association

THE Gas Section Convention of the Wisconsin Utilities Association will be held at the Racine Hotel, Racine, Wisconsin, on April 24 and 25. This year the Convention will emphasize problems of operation more than those of construction.

After the ordinary preliminaries on April 24, Chairman H. R. Broker, of the Wisconsin Gas and Electric Co., will present the chairman's annual address, and reports will be made by Professor O. L. Kowalke and his associates on the Gas Fellowship research work conducted at the University of Wisconsin. During the year, work has continued on aeration of burners presented last year. Because of the wide national interest in this work, many suggestions have been received and the research is being extended to include tests with hot burners duplicating practical operating conditions and to otherwise include additional phases of this investigation. A meter corrosion problem is also being undertaken under the Gas Fellowship.

The Thursday afternoon program will be largely in the hands of the Industrial Gas and Househeating Committee, of which F. M. Millington, of the Wisconsin Public Service Corp., is chairman. Several subjects of interest in this field will be presented. At 4 p.m. the meeting will adjourn for an inspection of the Racine gas plant, which is within a few blocks of the hotel. Previous to the trip a description will be given of the gas oven plant and Thylox Process, which are to be inspected. The annual dinner of the section will be held Thursday evening, April 24.

The Friday sessions will include a representative of the manufacturers of gas plant equipment and a résumé of plant equipment and processes for the removal of impurities which is being assembled by the Committee on Gas Manufacture, of which E. C. Brenner, of the Milwaukee Gas Light Company, is chairman. The Gas Meter Committee of which A. W. Kwapil, of the Wisconsin Gas and Electric Co., is chairman, will provide a paper on gas meter design, operation, tests and records.

The Gas Distribution Committees have arranged for the presentation of material relating to "Low Pressure Governor Operation," "Pipe Joints," "Construction in Outlying Thinly Settled Territory," "High Pressure Operating Problems and Expenses and the Effect of Adding Rural and Small Town Loads." Work is also being done on ratios of pumping pressure to quantity of gas delivered for given distances and pipe sizes.

W. E. Kemen, of the Milwaukee Gas Light Co., vice-chairman of the section, is chairman of the General Distribution Committee. The committee on High-Pres-

Convention Calendar

Oklahoma Utilities Association,
Tulsa, Okla.
March 11, 12, and 13.

Illinois Gas Association,
Springfield, Ill.
March 19 and 20.

Gas Section, Empire State Gas & Electric Association,
Elmira, N. Y.
March 27 and 28.

Maryland Utilities Association,
Hotel Willard, Washington, D. C.
March 28.

Accounting Section Conference,
Stevens Hotel, Chicago, Ill.
April 3 and 4.

Distribution Conference,
Hotel Statler, St. Louis, Mo.
April 9, 10, and 11.

Mid-West Gas Association,
Waterloo, Iowa
April 14, 15, and 16.

New Jersey Gas Association,
Asbury Park, N. J.
April 25.

Wisconsin Utilities Association, Gas Section,
Racine, Wis.
April 24 and 25.

Empire State Gas & Electric Association, Accounting Section,
Briarcliff Lodge, N. Y.
April 24 and 25.

Pennsylvania Gas Association,
Galen Hall, Wernersville, Pa.
April 29, 30, and May 1.

Western Div., Natural Gas Dept. A. G. A.
Roosevelt Hotel, New Orleans, La.
May 5, 6, 7, and 8.

Joint Production and Chemical Conference,
Hotel Cleveland, Cleveland, Ohio
May 21, 22, and 23.

Southern Gas Association,
Savannah, Ga.
June 10 to 13.

Canadian Gas Association,
Halifax, N. S.
June 24 and 25.

Michigan Gas Association,
Grand Hotel, Mackinac Island, Mich.
June 30, July 1, and 2.

Pacific Coast Gas Association,
Hotel Huntington, Pasadena, Calif.
Sept. 9-12.

Empire State Gas & Electric Association,
Saranac Inn, N. Y.
Sept. 18 and 19.

American Gas Association, Municipal Auditorium, Atlantic City, N. J., October 13-17, Alexander Forward, 420 Lexington Avenue, New York, N. Y., Managing Director.

sure Distribution is headed by N. P. Mueller, also of the Milwaukee Gas Light Co. The Intermediate and Low-Pressure Distribution Committee has for its chairman G. A. Anderson, of the Wisconsin Public Service Corp., Sheboygan. These men will present several of the distribution subjects. A representative of the Commercial Section will also discuss commercial aspects of high-pressure gas distribution.

Mid-West Gas Association

THE twenty-fifth anniversary of the Mid-West Gas Association will be celebrated at its convention scheduled for April 14, 15 and 16, at Waterloo, Iowa.

According to an announcement from R. B. Searing, secretary, the celebration will take the form of a home-coming affair. The tentative plans for the program include devoting one day as "Cleanliness Day," based on the national publicity of the Cleanliness Institute.

Papers will be presented on the following and other subjects: "Future of Domestic Gas Sales," "The Cleanliness Institute and Its Possibilities in Load Building."

Oklahoma Utilities Association

ABOUT 1,100 executives and employees of gas, electric, telephone and electric railway utility companies will attend the twelfth annual convention of the Oklahoma Utilities Association to be held at the New Hotel Tulsa, Tulsa, Okla., March 11, 12 and 13. General sessions, in which all branches of the industry will participate, will be held in the forenoon of each day and division meetings, including meetings of the gas division, will be held on the afternoons of the first two days. A safety meeting and demonstration will also be held Thursday afternoon, March 13, in which teams from gas, electric, telephone and electric railway companies are expected to give first aid and accident prevention demonstrations.

Among nationally known speakers who have thus far agreed to address the convention are: B. J. Mullaney, vice-president of The Peoples Gas Light & Coke Company of Chicago and president of the American Gas Association; and F. C. Hamilton, New York City, valuation and rate expert for Henry L. Doherty & Co. Each of these men will have a message of special interest to the gas people as well as to the others in attendance.

A number of gas equipment companies also have arranged for exhibits in connection with the convention. Manufacturers and jobbers of telephone and electrical equipment also will have displays.

At a recent meeting of the program committee of the gas division, Oklahoma Utilities Association, a program was arranged to include addresses on "Pipe Line Construction," by Elmer Schmidt, Dallas, Texas, Lone Star Gas Company; "Ways and Means of Promoting Domestic Sales in Natural Gas Territory," by F. M. Rosenkrans, Kansas City, Mo., new business manager, Gas Service Company, and "Maintaining Service" by F. F. Finney, Bartlesville, in charge of the Gas Department, Osage Distributing Company.

Other speakers will be engaged who are especially qualified to present the following subjects: "Problems in the Oklahoma City Gas Fields"; "Purchasing Agent Problems"; "Cleaning of Natural Gas"; "Servicing Gas Appliances"; "Southwestern Gas Measurement Short Course." D. A. Sillers, Dallas, Texas, Lone Star Gas Company, chairman of the Southwestern Gas Measurement Short Course Committee, will outline the purposes of the course and plans for the 1930 short course to be held at the University of Oklahoma, April 15, 16 and 17.

Among entertainment features of the convention will be the annual reception and ball Tuesday night, March 11 and the annual banquet and entertainment, Wednesday night, March 12. Special entertainment features will also be provided for the general convention and some of the division sessions.

Reception and hostesses committees have been appointed to see that public utility people and their guests are made to feel at home during the convention.

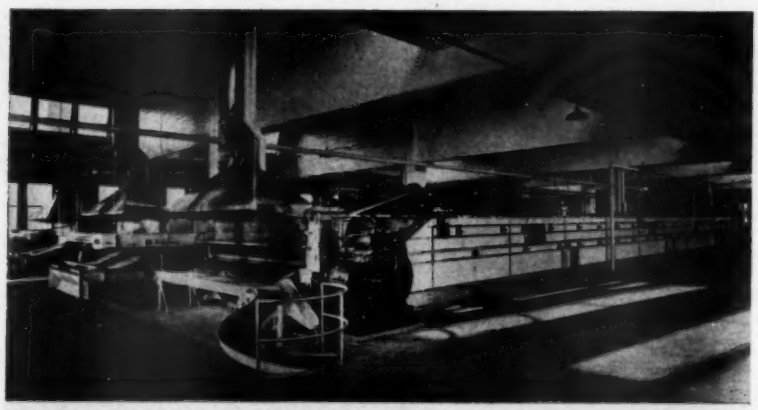
The program for the entire convention is being formulated by the General Convention Committee, E. F. McKay, manager of the Association, chairman, and by the division program committees.

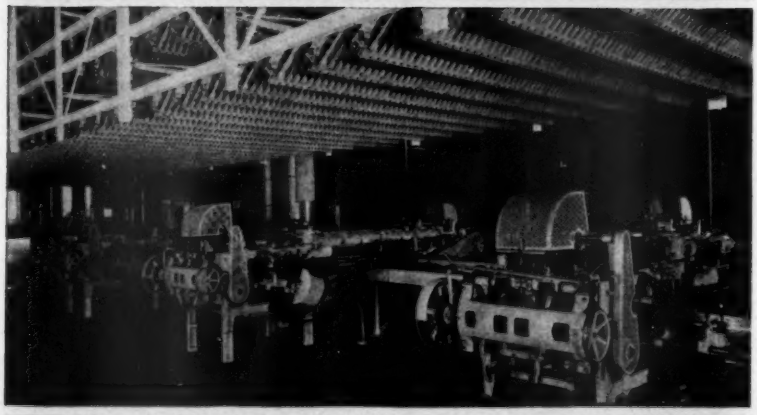
Southern Gas Association

THE Board of Directors of the Southern Gas Association has selected June 10 to 13 for the annual convention to be held at Savannah, Ga., according to an announcement by G. H. Schlatter, secretary. The keynote of the convention will be merchandising or the promotion of new business. A program committee is being organized by President D. H. Levan.

Gives Life Maintaining Service

ONE employee of the Oklahoma Natural Gas Corporation lost his life and many others worked in the open night and day throughout January's extremely cold weather in order to maintain adequate gas pressure in the distribution mains of the company.





ABOVE—*Gas-fired bake ovens, automatic and continuous in operation, which have a combined capacity of 12,000 loaves per hour.* CENTER—*Automatic bread-wrapping and sealing machine, fed by belt conveyors. Note overhead cooling racks with 7,800 sq.ft. Bread is received directly from the ovens on these racks and automatically cooled and then automatically delivered to the wrappers.* BELOW—*Four different brands of flour are blended in these machines, automatically and continuously*

By J. B. NEALEY
American Gas Association

—Gas

A GIGANTIC plant devoted to the mass production of bread, where weather is made to order, various operations synchronized by remote control, weights, measures, etc., guarded with automatic devices, baking 100 per cent mechanicalized, etc., etc., is quite an enterprise in itself. On the other hand take 50 such units, scatter them all over the United States and conrol them from one central office and laboratory, and you have a fair picture of the activities of the General Baking Company, New York City, creator and distributor of Bond Bread.

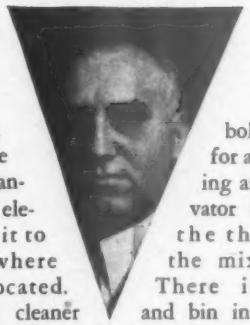
The Philadelphia plant of this concern is perhaps the largest and most modern bread baking establishment in the country for its present capacity is in excess of 285,000 loaves a day with considerable room for further expansion. The building has three stories and a basement, is of concrete and steel with floors and walls of white tile and contains floor space of nearly six acres. Light from spacious windows on all four sides, operators in spotless white uniforms, analyses of samples from every shipment of raw materials received and the fact that no human hands touch the bread or its ingredients while in process all contribute to maintain the high quality and purity of this brand.

There is storage in the basement for more than 2,000,000 pounds of flour, four brands being used in the blend, and a spur track holding six cars serves this department. The flour in bags is unloaded onto low racks, 12 bags to the rack, which are moved to storage by lift trucks. This method gives great flexibility and mobility to the stock.

Blending, cleaning, sieving, etc., is accomplished in a unit about 50 ft. long, 10 ft. high and 5 ft. wide, the larger part of which is a storage bin. The blending box is at one end and has four motor driven screw conveyors which operate at different speeds to properly proportion the flour as it is dumped in. The lower screw moves the blend forward to a bucket elevator which lifts it and discharges it onto the sifters, screens, etc., from which it drops into the bin which holds 80,000 pounds. Safety measures here include a device which cuts out all control switches while a mixer is in any position but that of upright.

The cleaned flour is moved forward and out of this bin by another screw

The Ultimate in Bread Baking for Largest Bakery



Mr. Nealey

to a machine bolting for a second cleaning and a bucket elevator then raises it to the third floor where the mixers are located. There is a smaller cleaner and bin in the basement for rye flour. The gigantic mixers, motor driven and five in number, are located on the third floor in one straight line, and each is served with a flour hopper and water tank.

The flour is distributed to these hoppers and mixers through a system of conduits, three in number, just overhead, which bring it from the bucket elevator. These conduits have screw conveyors and one is for wheat flour, one for rye and the other is used as a return for any excess flour. Take off tubes are located over each hopper.

The operations of blending, cleaning and delivery are synchronized with that of mixing by a remote control located at the mixers. The operator sets the correct weight on the hopper scale and closes a switch which starts the equipment motors in the basement and those driving the delivery conveyors and tips on end the balanced shutter in the flour feed pipe. The flour then pours into the hopper until the weight tips the scale arm which opens the circuit causing all of the motors to stop and the shutter in the feed opening to close. The opening of a shutter in the bottom of the hopper then allows the contents to drop into the mixer.

The ingredient room is directly adjacent and here a man with a truck holding 15 large batch cans passes progressively along a line of bins and weighs out the ingredients which are distributed to the mixers and dumped in with the water and flour. Yeast is added directly to the mixer from a motor driven emulsifier.

The motors rotating the mixers are then started and are automatically stopped by a unique device when the temperature of the dough has risen to predetermined temperature. This is accomplished with a dial with two hands, the first of which is set at the proper temperature. As the temperature rises it causes the other hand to move along the dial and when it contacts the first hand it acts to interrupt the motor circuit and stop the mixer.

Ordinarily the mixing operation would be limited to about seven minutes but to increase the time and the thoroughness of the mix, the mixers are water jacketted and cold water circulated around them. A proper mixing period is thus obtained giving a maximum development to the dough. The dough is then dumped into long troughs and allowed to stand, with cuttings and punchings to release the excess gases of fermentation several hours.

Here is where the first "weather" is made to order, for the atmosphere in the mixing and fermentation room must be maintained at the proper relative humidity which is supplied continuously and automatically by a humidifier and a system of distributing pipes. The temperature is also automatically maintained at the proper degree for best fermentation.

The fermented dough is dumped through chutes to the hoppers of three scaling machines on the floor below. These are motor driven and cut pieces

Mechanical dough-mixers which stop automatically when dough has reached a certain temperature

to loaf weight, six at a revolution, drop them onto belt conveyors to balling and rounding machines where they are formed and delivered to an elevator conveyor consisting of two vertical and parallel canvass belts between which they are lifted to long proofing boxes suspended from the ceiling.

Each of these boxes consists of an enclosed cabinet 90 feet long in which are five endless canvass belt conveyors, one above the other. The dough balls drop onto one end of the upper belt, travel along to the other end of the cabinet where they drop onto the belt below which projects slightly beyond the first, travels back to drop onto the third and so on until they fall from the bottom belt directly into a moulding machine which forms them into loaf shape. All of these machines and conveyors have individual motor drives, which are so synchronized that one "line," cutter, rounder, proofer, moulder, etc., will produce 90 loaves a minute.

The moulders also put the shaped pieces of dough into pans, one loaf to a pan, five pans at a time. These pans are then placed on racks with casters which are rolled into proofing rooms, one for each "line." These are of brick and provided with a humidifier which maintains the correct humidity and temperature.

The racks of bread are pushed out the other side of these three rooms directly in front of three traveling hearth bake ovens each 110 ft. long, 8 ft. high and with a hearth width of 10 ft. 2 in. These are indirectly fired with long gas pipe burners that are entirely

enclosed in U shaped tubes of stainless steel. Burners and tubes are built into one side of the oven and project across, a burner occupying one side of a tube the other side being used as a return duct giving up additional heat and conveying the products of combustion outside of the oven to a stack where they are vented outside of the building.

The walls are of magnesia blocks, 11 in. thick on the burner side and 8 in. on the opposite side. These walls are lined on the inside with rust proof metal sheets and on the outside with heavy opaque white gloss plates with stainless steel strips supporting the panels. The crown is substantially of the same construction. The supporting steel members are outside the oven and the only steel inside is for the support of the track for the conveyor chains. There is an opening at each end equipped with a counter weighted door and small inspection doors are located at intervals along the side. These ovens are not only efficient but beautiful to look at.

Experiments have been conducted for years in various plants of this company in order to establish which of the fuels available was on the whole the best and the most efficient as well as the most economical for baking bread, and gas was finally chosen as fulfilling these conditions. The traveling conveyor is the hearth of this oven and the gas burners are so located that approximately one-third will fire above and two-thirds below. They are manifolded, 6 or 8 to a header and there are 8 headers located along one side of the oven.

In this way any heating condition can be obtained in any portion of the oven and furthermore they can be automatically maintained at a correct temperature. Between two of these ovens is a panel with 16 temperature control instruments, 8 for each oven, one for each section. These are marked, Del. Top, Del. Bot., Mid-Del. Top, Mid-Del. Bot., Mid Feed Top, Mid Feed Bot., Feed Top and Feed Bot., Del. and Feed standing for the unloading and loading ends respectively. The dials on these instruments can be set at the desired temperatures, all different if necessary, and those heats will be automatically maintained in the various sections named. Four indicating pyrometers with multiple point switches are used to check these temperatures. Thermocouples in the oven and motor operated valves on the gas feeder lines complete the temperature control equipment.

Complete combustion is obtained by mixing air with the gas in the correct ratio and this is accomplished through an injector on each header and is automatically maintained regardless of the flow of the mixture by means of diaphragm valves on the gas and air lines supplying the injector. The gas pressure in the city mains usually runs from 3 to 7 in. water column but if the pressure is higher, pressure reducing valves are used. Air is supplied at from 4 to 6 pounds. This air is filtered and the blower is located on top of the oven.

Various safety devices are incorporated including a special spark plug giving a constant succession of sparks for each burner. If the current to a spark plug should fail it would open a circuit which would close a master safety gas valve in the supply line. This valve is held open by a solonoid only so long as the current flows. If the gas pressure should drop or the air blower stop, either or both would act to close the master valve. Practice has shown that even if the tubes were to become filled with an explosive mixture only a pop like that in the muffler of an auto occurs which does absolutely no damage.

Steam is blown into the charging end of the oven through a series of nozzles. Outlet ducts at different parts of the baking chamber and five in number, are provided with dampers for regulating the oven atmosphere.

The traveling conveyor consists of two endless chains, one on each side of the baking chamber, and between which are suspended steel plates 9 in. wide and 10 ft. 2 in. long, which form a solid hearth but allow the required flexibility when turning around the sprockets at either end for the return travel. This conveyor is motor driven through a reduction gear train and a variable speed transmission. A 5 horsepower motor is used and this rests on top of the oven. A tachometer shows the rate of conveyor travel.

Two of these ovens are mainly used for Bond Bread while the third bakes rye, French bread, etc., which require no pans but are baked directly on the hearth. The first two ovens are carried at from 450 to 500° F. while the last is heated to less than 300° F. The bread is very slowly baked to bring out all the flour of the wheat.

Operators place the pans of bread on the loading end of the conveyor and others remove them from the discharge end, dump the loaves out and into chutes which drop them onto cooling conveyors on the floor below and place the pans on a short cross-over conveyor which dumps them onto a long slat type conveyor which carries them the full length of the oven, over the proofing rooms and to the mechanical greasing machines. The products from the third oven are dropped through a circular gravity chute to a pickup conveyor on the floor below from which they are placed on racks for cooling and direct distribution to trucks.

There are two cooling conveyors each 100 ft. long and suspended from the ceiling. They consist of two traveling chains between which are suspended trays or channels on which are affixed a series of wooden fingers about a foot long, forming a V with the channel, and in which the bread rides. These are so suspended that they do not change position when the chains pass over the sprockets. The conveyor loops back and forth four times and at the end of the travel each tray in turn rides up over a sprocket which causes it to upset and allow the bread to slide off onto a cross-over conveyor which in turn dumps it onto a pickup table. Both coolers feed onto this table which consists of a traveling canvass belt feeding five automatic wrapping and sealing machines.

Surrounding three sides of this floor is an enclosed loading platform with sunken driveway which is nowhere farther away from the wrapping machines than 60 feet. From this platform 100 trucks or wagons can be loaded at one time. Deliveries are made with 65 automobile trucks and 170 wagons. The wagon routes vary from 10 to 18 miles daily while the truck routes average 40 miles with some hauls as long as 100 miles. Every night the salesmen turn in slips showing the amount of bread they will need

(Continued on page 137)

Accounting Section

J. L. CONOVER, Chairman H. W. HARTMAN, Secretary J. I. BLANCHFIELD, Vice-Chairman

Spring Conference of the Accounting Section

THE second annual Spring Conference of the Accounting Section will be held at the Hotel Stevens, Chicago, Illinois, on April 3 and 4. A well-balanced program has been prepared that will appeal to representatives of both manufactured and natural gas companies, and one that promises to be interesting and instructive to accountants, customer relations men, office managers and the general executives who will attend the gathering.

The two-day program will be opened with an address by B. J. Mullaney, president of the American Gas Association, followed by remarks from Major Alexander Forward, managing director of the Association.

Stanley P. Farwell, vice-president of the Business Research Corporation, Chicago, will speak on "Accounting Research for Gas Utilities." Two committee reports comprise the balance of the first morning's program. Herbert E. Cliff, of Newark, New Jersey, chairman of the Committee on Development of Accounting Systems and Office Labor-Saving Devices, will present a report on Consumers' Deposit Accounting, and John M. Kramarsik, Hartford, Connecticut, will outline a machine method for Stores Accounting.

The first afternoon session of the conference will be devoted to customer relations. E. P. Prezzano, Mt. Vernon, New York, chairman of the Customer Relations Committee, will address the conference on the necessity of following through on all service activities in order to insure complete customer satisfaction. Other speakers will be:

H. T. East, of Chicago, Illinois, on "Arrangement, Preparation and Delivery of Monthly Service Bills"; M. E. Brown, of Brooklyn, New York, on "Counters versus Desks"; and R. E. Haas, of New York City, who will outline a practical employee and customer relations program for a single company and a holding company.

Mr. Conover

Mr. Hartman

Three papers will be presented at the second morning session: "Why Gas Sales Analysis" by T. V. Purcell, Chicago, Illinois; the report of the Subcommittee on Classification of Merchandise Accounts, by C. J. Fue of Brooklyn, New York; and the report of the Payroll Subcommittee, by W. W. McLane, of Newark, New Jersey.

Office management problems will be considered during the final session of the Conference. E. B. Luce, of Baltimore, Maryland, will address the meeting on the subject of "Training the New Employee," and this will be followed by the presentation of a paper by F. G. Atkinson, of H. L. Doherty & Co., who will discuss the question of training the supervisor. A series of five-minute papers will then be presented, describing incentive wage plans for meter readers and collectors, as practiced by various utility companies. W. A. Sauer, of Chicago, will close the session with an address on "Taking the Convention Back Home."

It is expected that over 400 representatives from all parts of the country will attend this annual Spring Conference. All members of the association, as well as those in the industry who are not members, are urged to avail themselves of this opportunity to meet for the full discussion of these most important accounting and office management problems.

The tentative program follows:

Thursday Morning, April 3

(Session devoted to Accounting Research.)

Opening Remarks. John L. Conover, Chairman.

Address of Welcome. B. J. Mullaney, President, American Gas Association.

Response to Mr. Mullaney. A. M. Brundage, Consolidated Gas Company of New York, New York City.

Remarks. Alexander Forward, Managing Director, American Gas Association.

Accounting Research for Gas Utilities. Stanley P. Farwell, Business Research Corporation, Chicago, Illinois.

Report of Subcommittee on Consumers' Deposit Accounting. Herbert E. Cliff, Public Service Electric and Gas Company, Newark, N. J.

Report of Subcommittee on Stores Accounting. John M. Kramarsik, Connecticut Light and Power Company, Hartford, Conn.

Thursday Afternoon, April 3

(Session devoted to Customer Relations.)

Arrangement, Preparation and Delivery of Monthly Service Bills. H. T. East, Public Service Co. of Northern Illinois, Chicago, Ill.

Counters versus Desks. M. E. Brown, Brooklyn Union Gas Company, Brooklyn, N. Y.

Employee and Customer Relations. R. E. Haas, Columbia Engineering and Management Corporation, New York City.

"Follow Through." E. P. Prezzano, Westchester Lighting Company, Mt. Vernon, N. Y.

Friday Morning, April 4

(Session devoted to Accounting Problems.)

"Why Gas Sales Analysis." T. V. Purcell, Peoples Gas Light and Coke Company, Chicago, Illinois.

Report of Subcommittee on Classification of Merchandise Accounts. C. J. Fue, Brooklyn Union Gas Company, Brooklyn, N. Y.

Report of Payroll Subcommittee. W. W. McLane, Public Service Electric and Gas Company, Newark, N. J.

Friday Afternoon, April 4

(Devoted to Office Management.)

Training the New Employee. E. B. Luce, Consolidated Gas, Electric Light and Power Company, Baltimore, Maryland.

Training the Supervisor. F. G. Atkinson, H. L. Doherty & Co., New York, N. Y.

Incentive Wage Plans. (A series of five-minute papers).

For Meter Readers: J. M. Brodbeck, Northern Indiana Public Service Co.; W. R. Seidel, Rochester Gas and Electric Corp.; C. L. Hoffman, Consumers' Gas Co. of Reading, Pa.

For Collectors: E. W. Brown, Consumers' Gas Co. of Toronto; E. Johnston, Syracuse Lighting Company; W. R. Seidle, Rochester Gas and Electric Corp.

Taking the Convention Home. W. A. Sauer, Peoples Gas Light and Coke Company, Chicago, Illinois.

Closing Remarks. Chairman Conover.

New Counting Sorter for Gas Accounting

THE Accounting Section Committee on Development of Office Labor-Saving Devices submits the following item with reference to accounting machine improvements:

The Tabulating Machine Company Division, International Business Machines Corporation, has developed a printing counting sorter, to meet the demand for a device that will sort and count punched cards simultaneously at a high rate of speed.

This new device is connected with the sorting machine by means of an electric cable. As the cards pass through the machine to be sorted into any desired arrangement, the printing attachment will count and record any three previously selected classes of data. Either the sorting or the counting can be done independently.

Each printing unit of the counting sorter has fourteen type banks, one bank for each of the twelve vertical positions on the tabulating card and two for accumulating totals of all the positions.

Some of the features of the counting sorter are:

A speed of 400 cards per minute.
Prints in clear, legible type.
Accommodates a sheet of paper 27 inches wide.
Has a carriage of typewriter simplicity arranged for single or double spacing.
Simultaneously records number of cards for each classification in the proper type bank.
Has a five-digit capacity in each type bank and a six-digit capacity in the sub and grand total banks.

Electric Printing and Counting Machine

Flexibility of sorting and counting in various fields is accomplished by a simple plugging arrangement.

The counting sorter can be adapted to many uses in public utility accounting, especially in sales analysis work. For example, while the sorting machine is segregating the punched cards according to class of business the counting and recording attachment can be set to accumulate total customers at each consumption step. Each step can then be multiplied to secure total consumption and money.

This machine also can be applied to accident statistics, personnel records, stock distribution data, wage analysis and welfare data. Operating at a speed of 400 cards a minute, this device provides a rapid, economical method of compiling statistical information.

California Gas Waste

GAS waste in California during 1929 was so unreasonably high, says the *Oil Weekly*, that conservation leaders and state officials have openly branded this huge loss of an important natural resource as little short of criminal. In the race to produce more oil in the critical fields, both large and small operators were guilty in what may be regarded as a flagrant waste of gas.

Santa Fe Springs, with an average daily waste of perhaps 500 million cubic feet, accounted for the bulk of gas blown into the air. This waste reached one billion cubic feet on several days, due to the completion of wells in bunches. The heat value of this gas was equivalent to more than 200,000 barrels of oil. The State of California expressed grave concern over the waste at various times but failed in a series of attempts to stop the practice.

Gas waste at Long Beach did not average much more than 100 million cubic feet daily, but even this figure is considered entirely too high. Increased production at Santa Fe Springs reduced the demands for Signal Hill gas, the natural result having been a greater waste than ordinarily would have been recorded. The conservation program inaugurated late in the year reduced the gas waste by about 25 per cent.

Although totals for the year are not yet available, gas waste in California approximated 400 billion cubic feet during 1929.

Gas Industry Makes "Page 1" in S. E. P.

An interesting history of the gas industry is presented in the leading article of the February fifteenth edition of "The Saturday Evening Post," entitled "Energy, Wild or Tame," by Garet Garrett.

Two Wisconsin Men Win McCarter Medals

Mr. Herkes

GEORGE HERKES, fireman, of Beloit, and Charles Carney, stoker, of Portage, both employees of the Wisconsin Power and Light Company, were awarded McCarter medals on January 13 for saving lives by use of the prone pressure method of resuscitation.

Presentations were made by G. C. Neff, of Madison, vice-president of the Wisconsin Power and Light Company.

Application for these Thomas N. McCarter medals and awards were made through the American Gas Association and, after receiving the approval of the Accident Prevention Committee and the Executive Board of the Association, Mr. McCarter gave the medals.

Mr. Carney

The act for which the Beloit man was given the medal occurred in February, 1929, when Charles Spurling was overcome by gas in the engine room of the Beloit power plant. Aided by Carl Hume, foreman, Herkes removed Spurling from the room and resuscitated him.

Carney saved the life of Gus Lawson in the same manner in January, 1929, at Portage.

Industrial Gas Section

C. C. KRAUSSE, Chairman — C. W. BERGHORN, Secretary — D. W. CHAPMAN, Vice-Chairman

Effect of Atmospheres on Heat Treatment of Metals*

By E. G. DE CORIOLIS and R. J. COWAN
Research Engineers, Surface Combustion Company

This paper deals with the effects of various atmospheres on metals during typical heating operations ranging from 350° to 2500° F. These effects are shown to be essentially of a chemical nature.

Methods for the application of heat are duly considered. The limitations of each are determined by the character of the atmosphere surrounding the work. This has emphasized the necessity for a controlled atmosphere. The old designations of neutral, oxidizing, and reducing atmospheres have ceased to have a definite meaning in the light of more advanced knowledge.

Some account is given of the research work of the American Gas Association in connection with forging. The matter of burning of steel is considered and some new facts are given. A graph is presented showing the time-temperature relationship between carbon monoxide and scale formation at forging temperatures of steel.

The problem of bright-annealing is considered. This is affected by gases evolved when a metal is heated. The use of steam for the bright-annealing of copper is discussed. The effects of lubricants found on metal surfaces present problems in relation to the specific atmospheres in bright-annealing. Ways have been indicated for overcoming these problems.

METALS are heat-treated for the purpose of effecting a change in their structure, their shape, or their composition. Some heat-treating operations may involve two of these changes simultaneously. It is not the purpose of this paper to deal with these changes per se, for they lie in the realm of the metallurgist. Incidental to them, however, are questions which deeply concern the chemist.

As the name implies, heat treatment involves subjecting the metal to the effect of a thermal gradient, which in turn implies the derivation of heat in some form. As usually encountered in the arts, the source may be the combustion of a fuel, in which case heat is imparted to the metal by convection and radiation, or radiation alone may be applied, as when a muffle is intercepted between the metal and the burning fuel or an electric current is utilized through a resistor, resulting in the conversion of electric to radiant heat energy. In every instance some of the heat is imparted to the work by conduction, but this is not important in this analysis. Again the metal to be treated may itself be used as the resistor, resulting in the most direct possible application of heat. Finally, the metal may be placed within the field of a high-frequency current wherein by inductance energy is imparted to the metal with a resultant thermal rise.

The last two cases—viz., resistance and inductance—make possible an application of heat wherein the metal under treatment may be so confined as to reduce to a negligible factor the effects of a surrounding atmosphere. In all other cases, however, there is present within the vessel or furnace an atmosphere of some kind, the effects of which play an important part upon the particular process involved. This is specifically the subject matter of this paper.

Lest there should be some thought as to the possible solution of such atmosphere problems through the simple expedient of resorting to resistance and inductance methods, let it be said that such applications, for reasons that need not be discussed here, are limited by many practical considerations and play but a very negligible part in the whole field of heat treatment.

Notwithstanding the considerable strides made within the past ten years by the application of the electroradiant furnace to this field, its usefulness is sharply limited by adverse economic factors which no known developments are likely to alter within the immediate future. Were the enormous tonnage of steel now daily treated dependent upon electrothermal energy, it would require more than doubling the total output of all central stations at a cost so stupendous as to be well-nigh inconceivable; and in turn this would reflect itself on the cost of the finished product in a measure not permissible under present economic conditions. It will be pointed out later that the electroradiant furnace offers of itself no solution to the atmosphere problems of heat treatment.

In order more clearly to define the subject matter in hand, let it be said that it covers all operations from the low-temperature drawing of steel at 350° F. through the range of annealing, hardening, carburizing, normalizing, and high-temperature forging at 2500° F. Lying between these extremes are the annealing and forging of non-ferrous metals. All these operations are now being conducted to a preponderant degree in fuel-fired equipment.

The increasingly exacting requirements of industry have resulted in largely eliminating coal as a fuel for such operations. Where economic conditions permit, gas is the preferred fuel, with oil as the next choice where a compromise must be made between quality and cost. In either case there is presented the factor of atmosphere resulting from the combustion of the gas or gasified fuel and its effect upon the metal under treatment.

Atmospheres of Combustion

It is pertinent at this stage to consider briefly the composition of gaseous products of combustion. The old designations of neutral, oxidizing, and reducing atmospheres have ceased to have a definite meaning in the light of more advanced knowledge. A neutral atmosphere merely implies that up-

* Presented before the Division of Gas and Fuel Chemistry at the 78th Meeting of the American Chemical Society, Minneapolis, Minn., on behalf of the Committee on Industrial Gas Research of the American Gas Association.

A. G. A. Receives Certificate From Power Show

Certificate of Merit

THE exhibit of the American Gas Association, which was sponsored by the Industrial Gas Section, at the eighth annual National Exposition of Power and Mechanical Engineering, which took place at the Grand Central Palace, New York, N. Y., last December, was awarded a certificate of merit.

This certificate, which is reproduced above, is awarded to those only whose exhibits display special educational merit.

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on analysis at room temperature there are present nitrogen, carbon dioxide, aqueous vapor, and sulphur dioxide with no free oxygen or free carbon monoxide. An oxidizing atmosphere will contain, besides, free absorbable oxygen. A reducing atmosphere on partial analysis will contain no free oxygen but some free carbon monoxide as determined by the usual Orsat. However, as it results from the incomplete combustion of the fuel, some traces of sulphide or organic sulphur will be present together with some free hydrogen and partially decomposed hydrocarbons. In the case of a sulphur-free fuel, such as natural gas, sulphur in any form is of course eliminated.

The term "neutral," however, originally implied that a piece of metal, particularly steel, heat-treated in such atmosphere, would remain unaffected as to its surface, and the term "reducing" implied that this particular atmosphere was capable of reducing iron oxide or scale from the surface of the metal. Actually a neutral atmosphere is highly oxidizing to steel at elevated temperatures and the commonly accepted reducing atmospheres are but comparatively less oxidizing. The explanation is that carbon dioxide and water vapor, both of which are present in neutral and reducing atmospheres, are reactive to steel at elevated temperatures, and the higher the temperature the greater is this reactivity (1, 4). Thus it is that a piece of steel heated to forging temperature is invariably covered by a layer of scale. A scale-free forging is as yet unknown in industry.

These atmosphere effects are of tremendous consequence to the whole field of metal treatment. For years they have been accepted as the natural concomitants of the steps involved in production, with but crude attempts at mitigating the economic losses thus incurred. As steel scaled in process it was subsequently pickled. Along with the scale was dissolved an appreciable percentage of the metal. Pickling losses at 5 per cent of metal treated are still common, and the acidulous pickle waste is still polluting streams in most industrial centers. In addition there enters the human element. The pickling department is to the steel industry what the fertilizer department is to the packing industry. None but the lower-most strata of labor will accept employment therein. The forward march of the automobile and bathtub are driving such industrial operations to economic extinction. The pickling room must eventually be displaced. What is the solution?

The problem is here presented as a challenge to the chemical fraternity. Engrossed in the production of dyes, lacquers, and a host of synthetic substitutes, in the reclamation of wastes on the farm and in the factory, it is surprising how little attention chemists as a whole have devoted to this, one of the oldest waste problems of industry. Possibly this lack of interest results from a misconception that the question was purely a metallurgical one. Although knowledge of metallurgy is necessarily implied, it must seem evident that a proper solution can be arrived at only through the application of chemical reasoning and procedure.

Familiar as chemists are with the term "research" and its implication of organized effort directed to the solution of a problem, it may be surprising that this particular and seemingly orphaned problem should eventually find an apparently unrelated industry fostering the necessary organized effort toward its solution. The gas industry, through its organic body, the American Gas Association, is now engaged in actively pursuing research on this subject. The realization that gas is the one fuel eventually capable of providing the means for overcoming these operating difficulties has provided the impetus for this research.

It is not possible at this time to bring forth results of definite achieve-

ment. Some facts, however, may serve to elucidate the problem and indicate possible lines of further attack.

Forging

A comprehensive study conducted on behalf of the American Gas Association by W. E. Jominy at the University of Michigan has disclosed that, in addition to the usual scaling at these high temperatures, the composition of the atmosphere has a definite effect upon the burning of steel. The term "burning" is used to define such steel which, after being structurally damaged at these elevated temperatures, cannot be restored to normal structure by any subsequent heat treatment.

As reported by Jominy, a low-carbon steel, when heated in an atmosphere containing 6 per cent carbon monoxide, can be heated to a temperature 100° F. higher without burning than a similar steel heated in an atmosphere containing free oxygen. It is the practice in most forge shops to heat steel to the highest possible temperature to facilitate the subsequent hammering operation. The atmosphere in an electrically heated forge is highly oxidizing. In a gas-fired forge the atmosphere can be maintained as desired to a 6 per cent carbon monoxide content. The possibility of such application from the standpoint of insuring structural strength of the forging marks an advance heretofore unrecognized.

As previously set forth, however, even as high a content as 6 per cent carbon monoxide at forging temperatures does not eliminate oxidation of the metal surface. Such oxidation or scaling is highly undesirable.

Conjointly with the work undertaken at the University of Michigan, the Surface Combustion Company in their laboratories in Toledo are cooperating, on behalf of the American Gas Association, in working out practical applications to these forging problems. In these laboratories it has been determined that the non-scaling of steel is possible if the atmosphere can be maintained at a still higher carbon monoxide content. A muffle furnace was used to heat the steel and a partially burned atmosphere of city gas was passed through the muffle with the results shown in the accompanying

(Continued on next page)

Industrial Gas Bibliography

On March 4 all individual members of the Industrial Gas Section were mailed a copy of the Selected Bibliography of Industrial Gas Articles. From time to time, it is planned, supplementary lists of selected industrial gas articles will appear in the A. G. A. MONTHLY. At the end of the year, a bibliography for the industrial articles of value to date will be mailed to all individual members of the Industrial Gas Section.

Recent publications follow:

GENERAL DATA—A

Combustion—A-III

Oil & Gas Jl. ..... Determining compressibility of a gas ..... Jan. 16, 1930, p. 42
(Deviation from Boyle's law)

Western Gas ..... Compressibility of natural gas and methods for its determination ..... Jan. 1930, p. 49
(Deviation from Boyle's law of dry CO_2 and natural gas)

Furnace Design—A-V

Gas Age-Record ... Gas is economical for drying clay ..... Jan. 18, 1930, p. 71
(Rotary drum type dryer)

Industrial Gas ..... An efficient soft metal furnace ..... Jan. 1930, p. 14
(Furnace design)

Industrial Gas ..... Heat losses through furnace walls ..... Jan. 1930, p. 21
(Heat transfer curves, properties of refractory and insulating materials)

Iron Age ..... Destruction of galvanizing pots ..... Jan. 23, 1930, p. 294
(Segregation, overheating and mechanical defects chiefly at fault)

Miscellaneous—A-XIV

Industrial Gas ..... Gas extends its usefulness ..... Jan. 1930, p. 15
(Melting snow and ice from railroad slips and switches)

Western Gas ..... Gas engines won this load on economy ..... Jan. 1930, p. 39
(Cost—gas engine versus electric motor for water pumping)

Western Gas ..... Gas is superior in the round house ..... Jan. 1930, p. 35
(Lighting locomotives; data on gas versus fuel oil consumption)

Water Heating—A-XII

Electrical World ... Low versus high wattage water heater ..... Jan. 25, 1930, p. 209
(Adequate daytime recovery difficulties)

HEAT TREATMENT OF FERROUS METALS—B

Hardening—B-II

Trans. of the Amer. Soc. for Steel Treating ..... Some notes on the behavior of carbon tool steel on quenching ..... Feb. 1930, p. 161
(The relationship of quenching range and hardness penetration to the occurrence of soft spots, change of size in hardening and susceptibility to cracking is shown)

METAL MELTING—D

Galvanizing—D-III

Iron Age ..... Destruction of galvanizing pots ..... Jan. 23, 1930, p. 294
(Segregation, overheating and mechanical defects chiefly at fault)

Miscellaneous—D-XII

Industrial Gas ..... An efficient soft metal furnace ..... Jan. 1930, p. 14
(Furnace design)

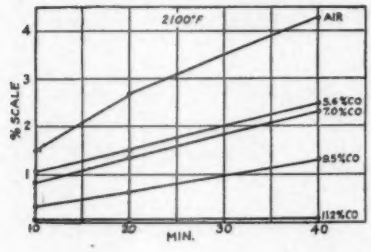
LOW TEMPERATURE BAKING AND DRYING—I

Miscellaneous—I-V

Gas Age-Record ... Gas is economical for drying clay ..... Jan. 18, 1930, p. 71
(Rotary drum type dryer)

Effect of Atmospheres

(Continued from page 123)



graph. The composition of Toledo city gas is as follows:

Methane	0.331
Ethylene	0.022
Hydrogen	0.478
Carbon monoxide	0.076
Carbon dioxide	0.025
Oxygen	0.004
Nitrogen	0.051
Propylene	0.013

It will be noted that the temperature of operation is 2100° F. In practical forging operation it would be difficult and costly to achieve higher temperatures by the use of a muffle. On the other hand, it is not feasible to burn city gas while maintaining such a high temperature of carbon monoxide and secure the desired temperatures. These conditions impose requirements of furnace construction not easy to achieve. However, it is believed that for the first time these conditions have been defined and the objective is now clearly in view. A practical solution would be of considerable import to the whole forging industry.

Hardening and Tempering

Whereas the scaling of steel at forging heats involves mechanical difficulties of operation which it would be desirable to eliminate, it is nevertheless possible to produce good forgings under present conditions because the affected outer surface is usually removed by grinding or machining in the process of converting the rough forging into a finished article.

A machined forging, however, is now seldom incorporated into mechanical equipment without subsequent heat treatment. This may involve carburizing or case-hardening followed by subsequent reheating, quenching, and drawing. Atmosphere effects in the carburizing process are not of consequence in so far as the metal surface is concerned, because the process itself necessitates the presence of highly reducing atmospheres containing an excess of free carbon. A discussion of these atmospheres and their effects upon the steel structure would of themselves constitute the subject of a lengthy paper. Suffice to say that unburned city gas as such is frequently used as the carbon-carrying agent surrounding the steel within the retort in which the process is carried out.

The reheating of a machined and carburized steel forging does present some problems in that scaling of the piece at this stage seriously affects the internal structure as well as the ultimate dimensions of the finished part. Many such parts must be made to fit into a mechanical assembly within close limits of tolerance and must maintain these tolerances as determined by the previous machining operation. In a gas-fired reheating furnace it is the universal practice to maintain the atmosphere on the reducing side, and in the majority of cases the very slight oxidation which takes place on the surface is not sufficient to affect the tolerances of the finished piece.

Where the carburizing operation has been so conducted that the carbon content of the case is close to the eutectoid point, the usual reducing atmosphere of the reheating furnace may not prove sufficient to prevent slight decarburization with resultant softening of the case. Greater precautions must then be taken. It has been found possible to harden carburized forgings perfectly by reheating in a gas-fired muffle furnace in which a slow current of unburned city gas is caused to flow through the muffle. The atmosphere is then similar to that in which the carburizing process itself was conducted, and therefore no decarburizing can occur, nor can the piece be scaled.

The tempering or drawing operation which completes the heat treatment of the forging is conducted at temperatures sufficiently low that the atmosphere effects are not a factor either as to the surface or structure of the finished piece. Taken as a whole, therefore, the heat-treating steps in preparing a machined forging for finished use do not present serious atmosphere problems which cannot be met by present equipment and methods.

Annealing

When mechanical force is applied to metals in the process of altering their shape, strains are set up in the structure of the metal which it is desirable or necessary to remove before the metal can be further worked. The usual procedure is to heat it up to a certain temperature varying with its nature and composition, followed by slow, gradual, or rapid cooling. "Annealing" is the generic term applied to all operations of this type.

The temperature range of annealing operations varies from 700° F. for non-ferrous metals to 2100° F. for certain high-temperature alloys. Almost invariably the metals so treated,

(Continued on page 135)

Box, Crate Construction

A new bulletin has been prepared by the Forest Products Laboratory, Madison, Wisconsin, embodying the results of shipping-container investigations by the United States Forest Service that have extended over a period of more than twenty years. It discusses the principles involved in the design and construction of nailed, locked-corner, cleated plywood, and wire-bound wooden boxes, corrugated and solid fiber boxes, nailed and wire-bound crates. Box specifications and a discussion of internal packing and car-loading are included.

This publication, "Technical Bulletin 171," now in the course of preparation, will be sent free to those requesting it as long as the supply lasts.

Industrial Publicity

The Publicity Committee, Industrial Gas Section of the American Gas Association, directs attention to the following articles, recently published:

"Enamel—From Jewelry to Everyday Use," *Ceramic Age,* Jan. 1, 1930.*

"Unique Features in the Ford Heat Treating Plant," *Industrial Gas,* Jan. 1, 1930.

"Mechanizing Hog Processing on the Reverse Assembly Line," *Industrial Gas,* Jan. 1, 1930.

"Steel Characteristics and Forging Furnace Design," *Heat Treating and Forging,* Feb. 1, 1930.*

"Fine Jewelry in the Making," *Manufacturing Jeweler,* Feb. 1, 1930.*

* Planned to use at this date.

Natural Gas Department

H. C. MORRIS, Chairman E. J. STEPHANY, Secretary H. C. COOPER, Vice-Chairman

Siphons for Removal of Water from Natural Gas Wells

A study of the design and operation of siphons for the removal of water from natural gas wells has been conducted by the United States Bureau of Mines, Department of Commerce, at the Petroleum Experiment Station, Bartlesville, Oklahoma. The siphon is recommended as the best means of removal of water from gas wells, under most conditions, by the bureau. It is pointed out, however, that it is first of all important that steps be taken to exclude encroaching underground waters from the well.

The removal of water from gas wells is one of the most serious problems in the production of natural gas, especially in old fields, states the Bureau in Technical Paper 460, by I. B. Williams, R. R. Brandenthaler and Morgan Walker. Usually the problem of water removal increases in importance as the production of gas declines; therefore, because many districts depend for their supply of gas upon wells that produce it only in small volumes, the problem is of major importance to producers and users of this fuel in many parts of the United States. However, the removal of water from gas wells should be considered of secondary importance to excluding water from wells, and whenever possible the source of water should be determined and preventive measures taken. Methods of excluding water from gas and oil wells are given in various publications of the United States Bureau of Mines.

Frequently the condition of the wells is such that the water occurring in the formations penetrated by the wells and in the producing gas sands can not be shut off satisfactorily, and operators are compelled to remove the water by pumping, bailing, or swabbing, or by employing a siphon after it has entered.

Engineers of the Bureau of Mines believe that the cheapest and best method for removing water from gas wells is by means of a siphon where applicable, and the present paper is written mainly to describe a siphon and its operation and to encourage its use as a device for removing water from gas wells. A discussion of the fundamental physical laws involved in the study and operation of the siphon is included, as well as theoretical deductions which have been derived. Other methods for removing water from gas wells, such as pumping, blowing, bailing, and swabbing, are discussed briefly in the report.

The term "siphon," as used in the natural gas industry, is applied to a pipe or tubing installed in a gas well to remove water. Its operation depends upon expansion of gas within the eductor pipe and the fact that the rising gas bubbles decrease the density of the column of water in the siphon line. Usually the pressure of the formation gas in the well suffices to start the siphon; but occasionally well pressures are too low, and additional gas under pressure must be forced into the well at the casing head. The first siphons were not equipped with jet holes to allow the gas to enter the eductor line above the point of water entry. Consequently, their operation was not entirely satisfactory. The siphon described in this paper is equipped with small jets through which the gas enters the eductor line, and its operation has demonstrated that jets are desirable.

A siphon consists of five essential parts: The siphon line or eductor tube through which the water and the gas used to lift the water flow to the surface; the wellhead connections; gas jets, or openings in the siphon line through which gas is admitted; water inlets, or openings in the lower end of the siphon line through which water may enter; and an "anchor" placed below the water inlet, which serves as a trap to prevent sediment from entering the siphon line.

From information at hand or easily obtained it is usually possible to determine whether or not a siphon will operate; hence, before either a continuous or an intermittent siphon is installed a careful study should be made of the history of the well. This information should include the following data:

(1) Depth of the well. (2) Daily gas production before the well became inoperative. (3) Water level in the well. (4) Record of shut-in pressure, often erroneously designated "rock pressure." (5) Working pressure which must be maintained on the well so that gas may be discharged into the field line. (6) Time required to drown out the gas and cause the well to cease producing gas.

PLAN SPLENDID PROGRAM FOR NATURAL GAS MEET

PLANS being formulated for the 1930 Natural Gas Convention, which will be held May 5-8 in New Orleans, indicate a meeting of surpassing quality and interest to the natural gas world.

The Program Committee has under consideration such an imposing list of subjects for papers and open forum discussion that it will be difficult to confine it to the necessary limits. The committee is elated over advance prospects of the convention and is working vigorously to attain the visioned success.

The Arrangements and Entertainment Committee is preparing an interesting program to supplement the business sessions. All reports thus far emanating from Natural Gas Headquarters, at Dallas, Texas, forecast a real convention.

Information regarding hotels, railroad fares and business programs will be sent out to natural gas men in the near future. While no exhibit of appliances will take place, there will be ample other features to make up the deficit.

The Roosevelt Hotel will be convention headquarters.

The first consideration in designing a siphon is to determine what disposition will be made of the gas from the siphon. If the gas which is produced through the siphon line with the water is conserved there is no necessity for attaining the maximum practical operating efficiency at the siphon installation. However, if the gas used in lifting the water to the surface is blown to the air, as little gas as possible, or in other words a low gas-water ratio, should be used to lift the water because gas blown to the air is an economic waste.

Technical Paper 460 contains details regarding the essential parts of a gas well siphon; the installation and operation of siphons; data required for design of siphons, etc. Copies of this paper may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at a price of 10 cents each.

Wrinkle Contest Awards Are Announced

THE Wrinkle Award Committee, Natural Gas Department of the American Gas Association, has announced, through Chairman H. C. Morris, the awards in the 1928-29 contest. They follow:

Transmission

First prize $25, Wrinkle No. 28—F. C. Walters; Oklahoma Natural Gas Corporation, Tulsa, Oklahoma.

Second prize $10, Wrinkle No. 8—Edward B. Konkler, Columbia Gas and Electric Corporation, Lancaster, Ohio.

Third Prize $5, Wrinkle No. 25—J. S. Worrall, Lone Star Gas Company, Healdton, Oklahoma.

Office

First Prize $25, Wrinkle No. 11—Herschel C. Ice, Monongahela West Penn Public Service Company, Fairmont, West Virginia.

No other awards in this classification due to lack of wrinkles.

Distribution

First prize $25, Wrinkle No. 6—George Offenbacher-T. J. Thatcher, Ohio Fuel Gas Company, Columbus, Ohio.

Second prize $10, Wrinkle No. 24—H. W. McKean, Ohio Fuel Gas Company, Findlay, Ohio.

Third prize $5, Wrinkle No. 27—J. J. Marsh, Ohio Fuel Gas Company, Columbus, Ohio.

Production

First prize $25, Wrinkle No. 17—C. A. Pearson, United Natural Gas Company, Oil City, Pennsylvania.

Second prize $10, Wrinkle No. 14—H. I. Masters, Hope Natural Gas Company, Mannington, West Virginia.

Third prize $5, Wrinkle No. 13—C. W. Zarbaugh, Hope Natural Gas Company, McWhorter, West Virginia.

Safety

First prize $25, Wrinkle No. 20—John H. Schalek, Peoples Natural Gas Company, Pittsburgh, Pennsylvania.

Second prize $10, Wrinkle No. 10—E. N. Corwin, Ohio Fuel Gas Company, Athens, Ohio.

Pay Tribute to Gas Service During Sub-Zero Weather

AFTER jogging along for a generation in comparatively warm weather, Texas suddenly decided to bring in 1930 with zero and sub-zero weather, and incidentally, with the severest test that Texas gas companies ever have had.

"Ten below," prophesied by the weather man is all in the day's work in the North and East, but in Texas it is apt to be a tragedy. The last time such extreme and continuous cold came to that part of the world was thirty years ago, before the era of natural gas as a fuel, so that when the thermometer hit the zero mark and kept on going down, last January, gas companies were put on trial all over the Lone Star State.

When the temperature is at zero the gas demand in each home is exactly double what it is when temperature is at 32 degrees, and even at freezing point the demand is several hundred per cent greater than it is on what might be termed an average day in Texas.

Texas "blue northers" are sudden and unaccountable at best. From a sunny warm day, the change to a bitter cold one is frequently rapid so that the gas companies are always on the watch for cold-weather warnings, but the first 1930 month broke all records.

The Lone Star Gas Company delivered more gas during that record-making blizzard than ever in its history, had more wells connected, more men in the field, and more compressor engines in operation than ever before.

This company controls its pressure by a system involving a gas dispatcher, 1,200 miles of telephone wire, 25 gas fields, 1,000 wells, 25 compressor stations, 3,500 miles of main high-pressure line. The system covers a territory of 150,000 square miles.

At the center of the system sits one man in complete control of the gas supply as far as is humanly possible. This is the gas dispatcher. By means of telegraph and telephone he has, at his command, a small army of pressure men and compressor station engineers.

The first report of the zero weather was telephoned to the dispatcher's office in the Lone Star building by a night pressure man at Duncan, Oklahoma, 200 miles north of Dallas, and one of the farthest north points of the system.

Then all the workmen on the field and every one in the system was put on his toes to meet this test.

The results of the supreme efforts of the Lone Star officials and men to meet the emergency was reflected throughout the State. Newspapers agreed in giving credit to the companies for their tremendous and successful efforts to keep away the cold from the homes of the people.

"Keeping Faith With the Public In An Emergency," was the way one newspaper headed an editorial, and another wrote simply, "They Delivered the Gas."

"Maybe few customers will think to thank the company or its men," said the *Dallas Morning News,* in an editorial, "but the thanks have been earned by fidelity under trial."

Publicity and Advertising Section

JAMES M. BENNETT, Chairman ALLYN B. TUNIS, Secretary DONALD M. MACKIE, Vice-Chairman

New England Gas Advertising Campaign Wins Recognition

UNDER the heading, "Results of Cooperative Newspaper Drive Please Gas Association," the *Editor and Publisher The Fourth Estate* refers to the success of the advertising campaign being conducted by the New England Gas Association. The article, which is illustrated with a sample of the cooperative newspaper copy being used in this campaign, was written by Carroll E. Pellissier, and it follows, in full:

"Cooperative newspaper advertising, if properly planned and executed, is of vast importance to any large industrial body. An outstanding example of this fact can be found in the campaign under the direction of the New England Gas Association, Boston. The campaign is sectional in scope at the present time but bids fair to become a part of a national campaign that will be planned much along similar lines.

"The drive of the New England organization has been so successful that it has been held up as a model for other gas associations throughout the United States.

"In charge of the New England effort is C. D. Williams, chairman of the Publicity Conference Committee, who heads this committee of six members. The Greenleaf Company, Boston agency, handles all the copy preparation and the placing of the advertising.

"It was back in March, 1928, almost two years ago, that the campaign got under way. In exactly 90 days from the date executives of the association approved the cooperative plan of newspaper advertising, the first copy appeared in print.

"To cover the cost of the 1928 campaign a sum of $144,436 was collected. Of this amount $136,160 was actually expended during this period. Eighty-eight per cent went for newspaper advertising, nine per cent covered copy preparation costs and the remaining three per cent covered supervision and office expenses.

"For the 1929 campaign a total of $150,000 was collected and of this amount the largest percentage, as in the case of 1928, went into newspaper space. Tie-ups to the newspaper campaign will include radio, leaflets, booklets, store displays, and folders, all of which are localized and are in the field of dealer helps.

(Continued on page 135)

A Piece of English Copy

Sun warmth in all your rooms!

Healthier House-warming with

THE NEW GAS FIRE

If you have ever sun-bathed on a serene summer's day, you have felt the soft warmth going through and through you. You can feel the sun giving you *health*. Now you can bask in front of the new Radiation Gas Fire and get a healthy, all-pervading warmth. This fire is unlike any that you have ever known. You could almost imagine that the sun had been brought into your room. You can sit quite close to this fire and not get scorched. You can sit away from the hearth and yet be cosily warm. Your skin doesn't become dry in front of this fire, your head doesn't feel heavy. It is a brighter fire, and warms up more quickly.

THE 'BEAM' RADIANT DISCOVERY

Radiation Ltd., the sole makers of these fires, have discovered a new radiant. These new radiants—'Thermo-XX Beam' Radiants, as they have been named—which are heated by the flames, are made of a special substance which throws off rays of heat known as the short infra-red rays. These are like the health-giving rays of heat emitted by the sun—those short infra-red rays that, instead of scorching the surface of the skin, penetrate well beneath it and enfold you with their beneficial warmth.

THE PERFECT GAS FIRE

For years Radiation Ltd. have been working to produce the perfect gas fire. They made the gas fire more efficient, more healthy, better-looking, economical with gas. They introduced the famous 'Injector Ventilator,' which as a part of the gas fire changes the air in a room several times in an hour. Now the seal has been set on their achievements by the 'Beam' Radiants. They have, in effect, captured part of the healthy heat of the sun to warm you in the dark, black days. You should make a point of seeing and testing the new gas fires at your Gas Showrooms.

Radiation GAS FIRES

with the new 'Beam' Radiants

Some interesting literature about the new discovery will be sent on application. Write to: Publications Dept. 41, Radiation Ltd., 164 Queen Victoria Street, London, E.C.4

This is an example of British Advertising Copy, taken from "Punch"

Commercial Section

G. E. WHITWELL, Chairman — J. W. WEST, Jr., Secretary — E. R. ACKER, Vice-Chairman

1930 Building Forecast

THE 1930 national building forecast, published by the National Trade Journals, Inc., gives interesting data on the changes in public demand for new buildings in 1930 as compared to 1929, which will indicate to the gas man what types of appliance sales and advertising should be stressed in 1930.

Some of the more important forecast data is shown in the table below:

The tabulation is divided into six geographical areas of the United States and figures are shown in nineteen building classifications. These figures will serve to show proportionate building activity in each district of the country and in each of the building types. They have been carefully developed in the same manner used successfully for the past eight years and while no human forecast can be accurate at least they have the advantage of indicating average possibilities for 1930.

In establishing any forecast of building activities it is of definite interest to analyze the changes in public demand evidenced for the coming year as compared with that of a year ago. Some of the changes are quite significant and of great interest.

The figures in the tabulation represent the percentage of total building demand indicated for each type of building in the year 1929 as compared with the year 1930. The figures given under the column heading "Change" represent the change in percentage figures. For instance, in the column of national percentage the change shown for automotive buildings is plus .6. This figure is obtained by subtracting the 1929 figure of 2.8 from the 1930 figure of 3.4 and signifies that an apparent demand for automotive building in this country has increased almost 1/5 at the beginning of the year 1930 as compared with the beginning of the year 1929.

Some of these figures show startling changes in the public demand for new structures. In analyzing these figures it must be remembered that they apply primarily to the types of buildings which come under architectural design and supervision, but after all, these represent the bulk of better building construction and reflect definitely the changing demand of the public for its buildings for 1930 as compared with the requirements of 1929.

In the tabulation of changes in public demand for new buildings the more interesting include the decrease of 15 per cent for apartment buildings. This is undoubtedly due to the fact that speculative building, which has been very heavy in this type, is to be less in 1930. Residential construction shows a falling off in dwellings under $20,000 probably for the same reason.

It is interesting to note, however, that there is an increase in public demand for larger dwellings from $20,000 upward. This is probably due to the fact that the amount of construction in that field during the past few years has not been commensurate with the increase in wealth. Perhaps people have been too busy making money to build as much in the field of expensive dwellings as might have been expected, but apparently in 1930, in spite of the troubles of Wall Street, many persons are getting ready to build homes of the better class. The surprising fact is that an increase is indicated in hotel building and this in spite of the fact that much has been done to discourage such construction.

Of course this figure is somewhat inflated by great projects, such as the new Waldorf-Astoria, and that the

CHANGES IN PERCENTAGES OF PUBLIC DEMAND FOR

NATIONAL PERCENTAGES, U. S. A.				NORTH ATLANTIC STATES			NORTHEASTERN STATES		
Type of Building	*Requirements for New Buildings by Percentages*			*Requirements for New Buildings by Percentages*			*Requirements for New Buildings by Percentages*		
	1929	*1930*	*Change*	*1929*	*1930*	*Change*	*1929*	*1930*	*Change*
Automotive	2.8	3.4	+ .6 About 20% greater	2.1	2.8	+ .7	5.4	5.8	+ .4
Banks	2.9	2.7	— .2 Slightly less	2.7	1.9	— .8	5.9	9.4	+3.5
Apartments	13.1	11.0	—2.1 About 15% less	18.5	19.3	+ .8	6.3	6.9	+ .6
Apartment Hotels	4.8	4.2	— .6 About 12% less	1.0	3.9	+2.9	1.0	.7	— .3
Clubs, Fraternal, etc.	3.4	3.2	— .2 Slightly less	3.5	2.6	— .9	2.7	1.4	—1.3
Community, Memorial	1.2	1.9	+ .7 About 50% greater	1.1	1.6	+ .5	1.3	1.6	+ .3
Churches	4.2	4.3	+ .1 About the same	2.8	2.7	— .1	7.9	3.1	—4.8
Dwellings (under $20,000)	3.6	2.7	— .9 About 25% less	4.2	2.0	—2.2	4.1	6.1	+2.0
Dwellings ($20,000 to $50,000)	2.3	2.7	+ .4 About 15% more	2.0	2.6	+ .6	3.9	2.9	—1.0
Dwellings ($50,000 and over)	1.9	2.2	+ .3 About 15% more	2.2	2.3	+ .1	2.5	3.3	+ .8
Hotels	6.7	7.8	+1.1 About 15% greater	4.8	4.7	— .1	8.1	3.4	—4.7
Hospitals	4.9	7.4	+2.5 About 50% greater	5.6	9.6	+4.0	7.1	8.3	+1.2
Industrial	7.5	5.8	—1.7 About 20% less	6.6	3.5	—3.1	7.6	3.6	—4.0
Office Buildings	13.5	13.5	—— About the same	12.3	14.9	+2.6	4.7	14.3	+9.6
Public Buildings	6.7	6.3	— .4 Slightly less	9.4	5.2	—4.2	5.8	3.5	—2.3
Schools	11.7	12.8	+1.1 About 10% more	8.4	11.2	+2.8	16.8	11.8	—5.0
Stores	3.4	3.3	— .1 About the same	4.0	4.4	+ .4	2.4	3.8	+1.4
Theatres	3.2	1.9	—1.3 About 40% less	3.2	1.3	—1.9	2.4	2.9	+ .5
Welfare, Y. M. C. A., etc.	2.2	2.9	+ .7 About 20% greater	2.4	3.5	+1.1	4.1	7.2	+3.1

forecast of hotel building is usually over-optimistic. This is due to the fact that many hotel projects under planning, being of a promotional nature, do not eventuate. There is apparently to be a considerable increase in the building of hospitals and this fact may be ascribed to the great hospitalization programs which are now getting actively under way. Such buildings, which are primarily supported by the people, are perhaps being stimulated by the Hoover program and many projects of this nature which might have waited will presumably start next year.

Gas Heater Exhibit

KEY men in the gas sales industry were attracted to the second annual Ruud eastern exhibition of gas water heaters which was held at the Hotel Commodore, New York, N. Y., the latter part of January. Similar exhibits are being staged in various sections of the country this year by the Ruud Manufacturing Company.

Mr. Pures is Inventor

CYRIL G. MORAIS, who was described last month as the inventor of "Muvafast," has asked THE MONTHLY to announce that John A. Pures, of the Public Service Company of New Jersey, conceived the idea of this invention. Mr. Morais said that he had developed this lifting device before placing it on the market.

Past Year Sales and Future Prospects of Gas Refrigeration

By JAMES P. HANLAN
Public Service Electric and Gas Company,
Newark, N. J.

DURING 1929 our gas department sold and installed 1852 gas refrigerators. The greater part of these sales was made to individual home owners.

In the merchandising of the gas refrigerator we found it desirable to have this newest gas appliance handled by our regular district sales representatives. Augmenting our regular district sales representatives, who also handle the sale of all other domestic appliances, excepting house heating, we placed in the field a crew of eighteen additional men, trained especially for refrigeration selling.

In looking back over our gas refrigeration sales activities of the past year, we find a great deal of encouragement in the following facts: First and foremost, the Electrolux gas refrigerator has a ready consumer acceptance in our territory. This is due, we believe, in a large measure to the comprehensive newspaper advertising conducted both by ourselves and our neighboring gas utilities, together with the manufacturer. The extensive national magazine advertising carried on by the manufactruer has created a certain prestige for the gas refrigerator, which reacts to our advantage whenever the proper sales pressure is exerted. We also know that our sales force, by its excellent missionary, educational and practical sales work, has paved the way for a big increase in gas refrigerator sales in 1930.

In addition to the factors above mentioned we find that we have another group of sales people who, strange to say, are not listed on our pay rolls; namely, the satisfied owners of gas refrigerators. We recently learned, much to our gratification, of the excellent educational sales work which was being done by enthusiastic owners of the gas refrigerator. In the early part of November a questionnaire was sent out to every owner of a gas refrigerator on our lines. Three hundred and fifty replies were received, many of which said that the writer had been in some measure responsible for another sale of a gas refrigerator to a neighbor, friend or relative. Here is a sample of the type of replies received:

"Have advised my friends to buy nothing else. Can trace three sales to my influence."

"I think it wonderful. Have advised many of my friends to purchase the gas refrigerator, rather than any other box."

NEW BUILDINGS IN 1930 COMPARED WITH 1929

SOUTHEASTERN STATES			SOUTHWESTERN STATES			MIDDLE STATES			WESTERN STATES		
Requirements for New Buildings by Percentages			*Requirements for New Buildings by Percentages*			*Requirements for New Buildings by Percentages*			*Requirements for New Buildings by Percentages*		
1929	*1930*	*Change*	*1929*	*1930*	*Change*	*1929*	*1930*	*Change*	*1929*	*1930*	*Change*
5.3	3.0	—2.3	2.9	3.9	+1.0	3.2	3.5	+ .3	2.4	2.7	+ .3
.8	.9	+ .1	1.6	2.2	+ .6	3.2	3.0	— .2	2.2	1.2	—1.0
7.5	4.2	—3.3	5.7	5.4	— .3	9.7	5.9	—3.8	14.3	11.1	—3.2
3.6	3.9	+ .3	4.3	5.1	+ .8	5.5	4.5	—1.0	7.1	5.9	—1.2
1.1	1.0	— .1	3.6	3.7	+ .1	3.8	4.7	+ .9	2.7	2.5	— .2
1.1	.4	— .7	1.6	1.2	— .4	1.0	1.6	+ .6	1.9	4.3	+2.4
16.3	14.1	—2.2	6.6	7.2	+ .6	3.9	4.4	+ .5	3.4	3.9	+ .5
4.8	4.8	——	3.1	2.4	— .7	2.3	2.5	+ .2	4.1	2.6	—1.5
4.2	3.8	— .4	2.1	2.1	——	2.1	2.8	+ .7	2.5	2.5	——
4.0	3.1	— .9	1.6	1.4	— .2	1.4	2.1	+ .7	2.2	1.8	— .4
10.1	14.8	+4.7	12.5	15.9	+3.4	5.7	5.4	— .3	11.2	17.0	+5.8
3.3	5.4	+2.1	3.5	9.6	+6.1	4.1	5.8	+1.7	5.6	3.9	—1.7
11.2	11.2	——	9.8	4.4	—5.4	8.7	8.7	——	4.9	4.8	— .1
3.5	.5	—3.0	11.4	8.7	—2.7	17.0	15.7	—1.3	14.8	11.8	—3.0
4.4	3.4	—1.0	5.1	3.9	—1.2	4.9	9.0	+4.1	4.7	7.1	+2.4
9.3	14.0	+4.7	16.5	15.9	— .6	14.4	13.7	— .7	9.8	12.1	+2.3
3.2	4.1	+ .9	2.2	2.1	— .1	3.1	2.7	— .4	3.9	2.4	—1.5
2.7	4.7	+2.0	2.1	3.1	+1.0	4.2	1.9	—2.3	1.5	1.5	——
3.6	2.7	— .9	3.8	1.8	—2.0	1.8	2.1	+ .3	.8	.9	+ .1

"I certainly have been able to recommend it highly—not as some do, by hearsay, but from actual experience."

"Several friends have bought one on my recommendation."

"Best on the market. I believe your Hackensack Office can tell you that I have personally sold five boxes to my friends."

These testimonials are typical of the ones which we received by the score. Surely, after reading these sample testimonials one must agree that we have, in a satisfied customer, an auxiliary salesman whose influence is something to be reckoned with.

For the year 1930 we plan to add sixty refrigeration salesmen to our selling organization. We will not only train these men in refrigeration sales methods, but will aid and supervise their activities in the field until they have sufficient confidence in their own ability to sell gas refrigeration. We deem this supervision to be of importance, secondary only to the instruction given them in our sales school.

Automatic Gas Plant Performs Perfectly

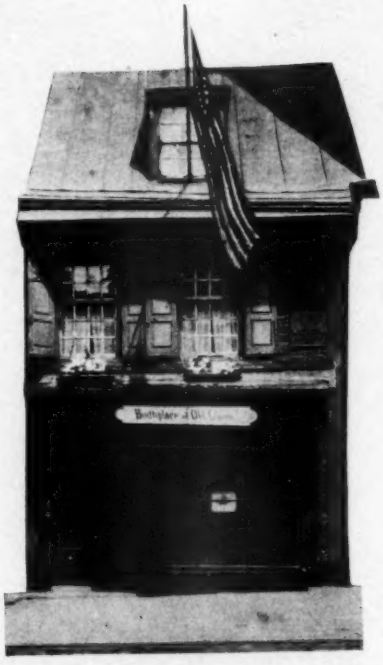
THE large new gas manufacturing plant of the Bangor Gas Light Company, which began operation on January 13, has rendered efficient service since its installation. The new plant, rising nearly a hundred feet in the air, has performed to the complete satisfaction of its most ardent admirers. As a result the fires in the old plant, maintained for precautionary purposes, have been extinguished for the first time since 1852.

The new plant, said to be the fourth of its kind in the United States, is a German product adopted in this country because of its efficiency and economy. Almost every action is automatic and much human labor has been eliminated. The plant has a capacity of 300,000 cu.ft. per day, which is considered ample to fulfill existing needs for many years. The resulting improvement enables the company to greatly expand its business; giving the neighboring territory the benefit of the gas supply and catering to the multitudinous new uses being created for gas.

Abolishing Slot-Meters

THE Philadelphia Gas Works Company henceforth will encourage the elimination of slot-meters. These meters are said by the company to be expensive to maintain. However, gas users who now have such meters and wish to retain them will not be disturbed. Meters of the ordinary type will be installed as fast as the opportunity arises.

Birthplace of Flag Heated Now by Gas



Betsy Ross House

CUSTODIANS of the Betsy Ross House, "Birthplace of Old Glory," Philadelphia, have decided that the quaint charm of open fireplaces hardly offsets the fire hazard, dirt and work incidental to this old-fashioned heating device, and have installed Gasteam radiators in the famous shrine.

The Betsy Ross House, on Arch Street, Philadelphia, at the time of the Revolution was an upholsterer's shop kept by John Ross who later gave his life fighting for American Independence. In May, 1776, George Washington and a committee employed Ross' daughter, Betsy, to make a sample flag containing thirteen stars and stripes, symbolic of the original thirteen American Colonies. So pleased was the committee with the work of Miss Betsy that her flag was made the national ensign.

So precious a national shrine has that little shop become that the custodians decided to install a heating system which would reduce fire hazard to a minimum, besides furnishing adequate and efficient heating. Clow Gasteam radiators were chosen.

P. U. A. A. Better Copy Contest to Close March 15

AT a meeting of the officers and directors of the Public Utilities Advertising Association, held at Detroit, Michigan, last January, it was announced that "The Better Copy Contest" will close on March 15, 1930. Several member companies of the A. G. A. are expected to have entries in this contest. Judges have been called to meet in New York April 3 to make selection of the various awards.

Announcement was made that the 1930 annual convention of the P. U. A. A. will take place at Washington, D. C., May 18 to 21, inclusive. The Advertising Federation of America will hold its twenty-sixth annual meeting at the National Capital at the same time. J. M. Bennett, chairman of the Publicity and Advertising Section of the A. G. A., also is chairman of the P. U. A. A. Convention Program Committee. C. M. Sharpe, of the Potomac Electric Power Company, Washington, is chairman of the Convention entertainment committee.

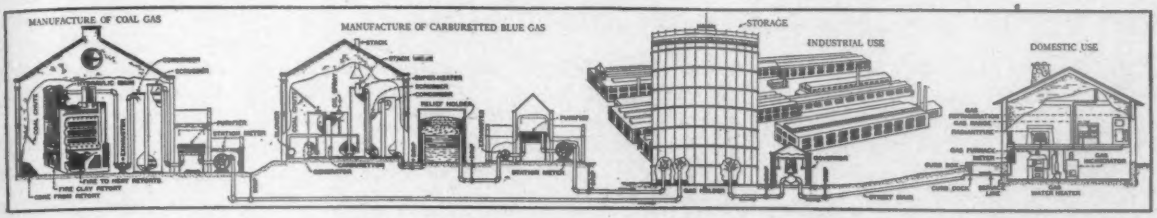
It is planned to have the Utility Advertising Association represented on the program of the general sessions of the Federation. The president, Louis D. Gibbs, will represent the former body.

One of the interesting features of the Detroit meeting was presentation of a paper on "Customer House Organs," which was prepared by Howard F. Weeks, assistant manager, advertising and display department of The Consolidated Gas Company of New York.

Manufacturers Section

F. G. CURFMAN, Chairman C. W. BERGHORN, Secretary E. S. DICKEY, Vice-Chairman

Telling the Public How Gas is Manufactured



DESCRIBING the accompanying illustration, the Illinois Committee on Public Utility Information explains the process of manufacturing gas in such simple language and terms that all laymen may understand the operation.

This sketch and the following description are being distributed by the Illinois Committee:

"Two processes for manufacturing gas are illustrated in the accompanying drawing; one is the coal gas process, and the other the carburetted blue (water) gas process. Both are in common use in Illinois.

"Bituminous (soft) coal is distilled in coking ovens to make coal gas.

"To make carburetted blue (water) gas, steam is injected into a chamber containing hot coke, and oil into a heated carburettor. In the resulting chemical reactions, the gas is formed.

"Following is a brief description of some of the gas-making and distributing equipment pictured above:

"Condenser: This contains tubes through which the hot gas passes. The tubes are surrounded by water which absorbs heat from the gas.

"Scrubber: This consists of a cylindrical tower containing a number of wooden trays having slats arranged crosswise in checker board fashion. A water spray at the top of the tower keeps the slats wet, and these wet slats gather tar from the passing gas.

"Purifier: This is a large box containing two trays filled with oxide of iron which chemical absorbs sulphur impurities from the gas.

"Gas Holders: Two types of gas holders are in common use and both types are illustrated.

"The water type is shown in the 'relief holders.' It consists of a tank filled with water in which is placed a smaller, inverted tank. Gas is stored in the smaller tank, which rises and falls as the quantity of gas varies. The water acts as a seal to prevent gas escaping.

"The waterless type holder, captioned 'storage,' consists of an upright steel cylinder in which a close-fitting piston moves vertically, rising and falling as the quantity of gas beneath it varies.

"Station Meter: This is a large meter which measures the quantity of gas manufactured.

"Storage: After it is made, gas is stored in big holders until it is needed by the consumers.

"Governor: This is a device that regulates and evens the pressure of the gas in the mains.

"Delivery: From the governor the gas goes into the street mains, service line, house meter and to the appliances.

"The number of uses for gas is increasing constantly. In homes it is used for cooking, water heating, refrigeration, incineration and house heating. It has thousands of uses in industry, and new ones are being found almost daily."

Gas Measurement Course at Norman, Oklahoma

THE seventh annual Southwestern Gas Measurement Short Course, conducted by the College of Engineering, University of Oklahoma, assisted by the Oklahoma Corporation Commission and the Oklahoma Utilities Association, will be held at Norman, Okla., April 15, 16 and 17. Representatives of natural gas utilities and natural gasoline manufacturers, also of gas meter manufacturing companies will attend the school.

"Synthetic Fuel"

INFORMATION from Bochum, Germany, announces important tests are being made at the nitrogen plant of the Ruhr Chemical Company at Holten to produce synthetic fuel from coke after a process called "benzol synthesis," by Geheimrat Fischer of the Coal Research Institute at Muelheim in the Ruhr. The basic materials used for the experiments are soluble glass, furnace gas, generator gas, smelting work gas, and mixtures of carburetted hydrogen and furnace gas. All the products of the oil industry, from benzine to solid paraffin, are extracted directly in pure conditions. Five tons of coke are needed to extract one long ton of benzine.

Gas Executives Inspect Worcester's New Plant

THE new water gas plant of the Worcester Gas Light Company, Worcester, Mass., recently was inspected by a large group of the gas industry's officials.

There were present as hosts J. I. Mange, president of the Worcester Gas Light Co. and the Associated Gas & Electric Company of New York; Frank H. Golding, vice-president and general manager of the New England Gas and Electric Association; DeWitt Clinton, vice-president and treasurer of the Worcester Gas Light Co. and assistant treasurer and secretary of the New England Gas & Electric Association; Isaac T. Haddock, general manager of the Worcester Gas Light Co., and Arthur C. Frey, general superintendent; C. A. Greenidge and Sanford J. Magee, vice-presidents of the J. C. White Management Corporation; W. E. Steinwedell, president, and L. C. Hamlink, vice-president of the Gas Machinery Co., Cleveland, which built and installed the new equipment, and Dr. Daniel Starch, New York, a director of the Worcester Company.

Visitors also included representatives of the city government and Chamber of Commerce. The new plant began production the latter part of January.

Technical Section

B. V. PFEIFFER, Chairman H. W. HARTMAN, Secretary R. G. GRISWOLD, Vice-Chairman

Distribution Conference—St. Louis, April 9-11

By J. H. BRAINE
Chairman, Distribution Committee

A MAJORITY of the Distribution Committee voted in favor of holding the Conference in a Mid-Western city this year and a large number expressed their preference for St. Louis. It was, therefore, decided by the Executive Committee to hold the Conference at the Statler Hotel in that city on April 9, 10 and 11.

An earnest effort has been made by the Executive Committee to prepare a program that will have elements of interest for both manufactured and natural gas men, and it is hoped that a large attendance from both branches of the industry will be secured through the location of the Conference in a natural gas territory.

Three standing committees are continuing their work this year.

The Committee on Pipe Coatings and Corrosion has been continued under the chairmanship of J. K. Crowell, Bradford, Pennsylvania. A report of progress in the Pipe Coatings Research will be submitted by Dr. Scott Ewing, American Gas Association Research Associate at the Bureau of Standards, followed by talks by Gordon Scott, A. P. I. Research Associate, and Dr. Dennison of the Bureau of Standards. K. H. Logan, Bureau of Standards, has supervised the burying of specimen pipes in Louisiana, Texas, Florida, Georgia and North Carolina and specimens are to be buried in the Far West at an early date.

The Committee on Pipe Joints is continued under the chairmanship of O. S. Hagerman, American Light and Traction Company. A great deal of valuable work has been done by this committee and many interesting results arrived at which will be reported in a progress report by K. R. Knapp, Research Engineer, who is directing the pipe joint research at the Cleveland Laboratory.

H. W. Battin, United Gas Improvement Company, will also have a progress report to make at the Conference in connection with research work on pipe joints done in Philadelphia.

The Committee on Economics of High Pressure Transmission of Gas, under the chairmanship of G. A. S. Cooper, Public Service Electric and Gas Company, Newark, N. J., is getting together some very comprehensive data in addition to those already furnished by former chairmen of this committee and will have a progress report ready for the Conference.

In connection with the presentation of this report it is expected that engineers of the Bureau of Mines will present data available to date on Natural Gas Pipe Line Flow.

The Committee on Distribution Design has also been continued this year under the chairmanship of C. S. Goldsmith, The Brooklyn Union Gas Company, Brooklyn, N. Y. It is felt that the work of this committee is of great importance and numerous inquiries have been received from distribution engineers, particularly as to problems involved in converting distribution systems from manufactured to natural gas. It is felt that this committee has a wide field of opportunity and that in all probability the work should be continued from year to year by a standing committee.

A number of inquiries were received as to the status of recent developments in pipe materials and in order to gather data from engineers, manufacturers, etc., a Pipe Materials Committee was formed of which M. I. Mix, The Peoples Gas Light & Coke Company, Chicago, is chairman and which it is thought should also be carried on from year to year as a standing committee.

Mr. Mix also is chairman of a committee which is doing excellent work in effecting a standardization of plain end fittings. Progress reports of both these committees will be available for the Conference.

Walton Forstall, United Gas Improvement Company, Philadelphia, Pa., retains his chairmanship of the Committee on Cast Iron Pipe Standards.

Ralph Orme, Missouri Natural Gas Company, St. Louis, Mo., has been asked to undertake the chairmanship of the Committee on Distribution Portable Equipment, and to report at the Conference on recent developments in such equipment. It is hoped that this report will have a special interest for natural gas men as Mr. Orme is in a position to secure first-hand information with reference to equipment used on recently installed natural gas lines.

W. H. Bettle retains the chairmanship of the Meter Committee and has included in his subject a discussion of cast iron meters and also a contribution by D. A. Sillers, Lone Star Gas Company, Dallas, Texas, on the subject of orifice meters and their possible use in the manufactured field for the measurement of output from outlying stations, district regulators, etc.

Many splendid suggestions were received by the committee for subjects which might be brought up at the Conference. It would not be possible to include all of these very valuable suggestions as program items due to the time limitations at the Conference. However, ample time has been set aside for an open forum at which it will be possible to obtain a discussion by the members present on a number of these items.

It is hoped that this will be a record Distribution Conference and no hesitation is felt in stating that there will be elements of interest for engineers from all parts of the country. A

copy of the tentative program follows:

First Session

Wednesday, April 9, 10:15 a.m.

Address of Welcome. O. B. Evans, President, The Laclede Gas Light Co., St. Louis, Mo.

Report—Distribution Design Committee. C. S. Goldsmith, Chairman, Brooklyn, N. Y.

Paper—Design of Distribution Buildings. Author to be announced.

Report—Cast Iron Pipe Standards Committee. Walton Forstall, Chairman, Philadelphia, Pa.

Second Session

Wednesday, April 9, 2:00 p.m.

Report—Pipe Joints Committee. O. S. Hagerman, Chairman, Chicago, Ill.

Progress of Pipe Joints Research. K. R. Knapp, A. G. A. Laboratory, Cleveland, Ohio.

Pipe Joints Research at Philadelphia. H. W. Battin, The United Gas Improvement Co., Philadelphia, Pa.

Paper—Unaccounted for Gas. J. M. Pickford, Midland United Corp., Chicago, Ill.

Report—Committee on Distribution Portable Equipment. Ralph Orme, Chairman, St. Louis, Mo.

Third Session

Thursday, April 10, 10:00 a.m.

Report—Meters Committee. W. H. Bettle, Chairman, Newark, N. J.

Paper—Orifice Meters. D. A. Sillers, Lone Star Gas Co., Dallas, Texas.

Paper—Public Relations from the Distribution Engineer's Standpoint. R. L. Ellis, Public Service Electric & Gas Co., Newark, N. J.

Fourth Session

Thursday, April 10, 2:00 p.m.

Report—Pipe Coatings and Corrosion Committee. J. K. Crowell, Chairman, Bradford, Pa.

Progress in Pipe Coatings Research. Dr. Scott Ewing, A. G. A. Research Associate, U. S. Bureau of Standards, Washington, D. C.

Address—A. P. I. Research. Gordon Scott, A. P. I. Research Associate.

Address—"Correlating Soil Characteristics with the Corrosion on an Oil Line." Dr. Dennison, U. S. Bureau of Standards, Washington, D. C.

Report—Committee on Economics of High Pressure Transmission of Gas. G. A. S. Cooper, Chairman, Newark, N. J.

Presentation—Manufactured Gas Natural Gas.

Report—Pipe Materials Committee, Plain End Fittings. M. I. Mix, Chairman, Chicago, Ill.

Fifth Session

Friday, April 11, 10:00 a.m.

Paper—Training of Fitters. W. J. Buckley, The Peoples Gas Light & Coke Co., Chicago, Ill.

Paper—Shop Practice and Customer Service. T. J. Perry, The Brooklyn Union Gas Co., Brooklyn, N. Y.

OPEN FORUM.

Sixth Session

Friday, April 11, 2:00 p.m.

OPEN FORUM.

(This entire session will be devoted to the discussion of subjects brought up by attending delegates for consideration at the Conference.)

Our New Members

Harlowe, Leslie S., Louisiana Oil Ref. Corp., First National Bank Bldg., Shreveport, La.

Lyman, Henry Pratt, Citizens Gas Co., Fort Smith, Ark.

Pierce, Ralph B., Louisiana Oil Ref. Corp., First National Bank Bldg., Shreveport, La.

Shahnasazov, M., Azneft, Baku, U. S. S. R., Russia

Tierney, John Thomas, The Koppers Co., 1650 Koppers Bldg., Pittsburgh, Pa.

Von Lampe, William H., Westchester Lighting Co., 9 South 1st Ave., Mt. Vernon, N. Y.

Yeager, Ulysses Byron, International Coal Carbonization Co., 200 Madison Avenue, New York, N. Y.

Beach, Brewster S., Carrier-Lyle Corp., Newark, N. J.

Fisher, Howell, The Bartlett-Hayward Co., Baltimore, Md.

Hagaman, J. L., Atlantic Creosoting Co., Inc., Norfolk, Va.

Hanson, F. A., Illinois Northern Utilities Co., Dixon, Ill.

Witt, Herbert N., Thebo, Starr & Anderton, Inc., 523 Sharon Bldg., San Francisco, Cal.

Dietrich, Arthur E., Pittsburgh Coal Co., Oliver Bldg., Pittsburgh, Pa.

Bronson, Deming, Hill, Hubbell & Co., 11 Broadway, New York, N. Y.

Saunders, Frank B., Philadelphia Co., 435 Sixth Ave., Pittsburgh, Pa.

Hennessy, D. J., Philadelphia Company, 435 Sixth Ave., Pittsburgh, Pa.

McGowan, Charles L., Equitable Gas Co., 435 Sixth Ave., Pittsburgh, Pa.

Hart, John L., Bronx Gas & Electric Co., 43 Westchester Sq., New York, N. Y.

Pendleton, Mark, Iowa Public Service Co., 515-17 Fifth St., Sioux City, Ia.

Fry, Orville E., Public Service Co. of N. Ill., 72 W. Adams St., Chicago, Ill.

Hay, Porter W., Public Service Co. of Northern Ill., 72 W. Adams St., Chicago, Ill.

Miller, W. H., Public Service Co. of N. Ill., 72 W. Adams St., Chicago, Ill.

Henness, Charles F., Public Service Co. of N. Ill., 72 W. Adams St., Chicago, Ill.

Gamble, S. B., Public Service Co. of N. Ill., 72 W. Adams St., Chicago, Ill.

Annable, Kenneth D., Kings County Lighting Co., 6740 Fourth Ave., Brooklyn, N. Y.

Bandy, Ballard Y., Public Service Co. of N. Ill., 72 W. Adams St., Chicago, Ill.

Hodgson, Harry E., Phila. Gas Works Co., 1401 Arch St., Phila., Pa.

Prebile, J. Donald, Public Service Co. of N. Ill., 72 W. Adams St., Chicago, Ill.

Turpin, Alexander J., Public Service Co. of N. Ill., 72 W. Adams St., Chicago, Ill.

Davis, Leroy J., Consumers Gas Co., 441 Penn St., Reading, Pa.

Ketcham, E. D., Central Hudson Gas & Electric Corp., 50 Market St., Poughkeepsie, N. Y.

Fenelon, Howard J., Central Union Gas Co., 529 Courtlandt Ave., New York, N. Y.

Robertson, Jerome B., Texana Oil Co., Vincinnes, Ind.

Hutchins, William Thomas, Consolidated Gas Co., 4 Irving Place, New York, N. Y.

Springborn, Harold William, Robbins Publishing Co., 9 East 38th St., New York, N. Y.

Stewart, G. U., Philadelphia Electric Co., 1000 Chestnut St., Phila., Pa.

Ford, John F., Philadelphia Electric Co., 1000 Chestnut St., Phila., Pa.

McBride, Joseph A., United Engineers & Constructors, Inc., 112 N. Broad St., Phila., Pa.

Glover, Clarence C., United Engineers & Constructors, Inc., 112 N. Broad St., Phila., Pa.

Kirkpatrick, George Myers, Blaw-Knox Co., Pittsburgh, Pa.

Patrick, Robert F., The G. S. Blodgett Co., Inc., Burlington, Vt.

Nelson, Rudolph Stokes, The Hoover Co., North Canton, Ohio

Hindley, Richard R., Detroit-Michigan Stove Co., 6050 E. Jefferson Ave., Detroit, Mich.

Shaw, O. J., Nebraska Natural Gas Co., Lincoln, Nebraska (1215 Sharp Building).

McLachlan, Benjamin H., Pennsylvania Gas Co., 213 Second Avenue, Warren, Pa.

Peterson, A. Raymond, Pennsylvania Gas Co., 213 Second Ave., Warren, Pa.

Hinderer, J. Wilber, Pennsylvania Gas Co., 213 Second Ave., Warren, Pa.

O'Malley, F. E., Iowa-Nebraska Light & Power Co., Red Oak, Iowa

von Schrader, Atreus, N. Y. State Com. on Public Utility Information, 5839 Grand Central Terminal, New York, N. Y.

Logan, Lloyd, The Johns Hopkins University, Baltimore, Md.

Clough, Roy Graham, du Pont Ammonia Corp., Wilmington, Del.

Thomson, Melvin T., Guaranty Co. of N. Y., 31 Nassau St., New York, N. Y.

Lyons, Henry N., Henry L. Doherty & Co., 60 Wall St., New York, N. Y.

Anderson, Martin A., Philadelphia Sub. Counties Gas & Electric Co., Philadelphia, Pa.

Buchman, Amos R., East Ohio Gas Co., Cleveland, Ohio

Bunnell, William S., Consumers Gas Co., Reading, Pa.

Gutierrez, Pedro, Rosario Gas Co., Rosario, Argentina

Hopkins, Joseph S., Public Service Electric & Gas Co., Camden, New Jersey

Jensen, Olaf V., Jensen, Bowen & Farrell, Ann Arbor, Mich.

Jones, Owen, Earlsboro Gas Co., Earlsboro, Okla.

Keller, Edward J., New Amsterdam Gas Co., New York, N. Y.

Owens, W. F., Southwest Gas Co., Ada, Okla.

Power, William A., East River Gas Co. of L.I.C., Astoria, Long Island

Baker, William J., The Shanghai Gas Co., Ltd., Shanghai, China

LaCour, Mrs. Ethel, "Natural Gas" Magazine, Cincinnati, Ohio

Cunningham, J. F. E., Public Service Co. of Colorado, Denver, Colorado

Henry, C. D., Central Illinois Light Co., Peoria, Ill.

Vincent, W. G., Pacific Gas & Electric Co., San Francisco, Cal.

Albert, Edwin F., Philadelphia Gas Works, Philadelphia, Pa.

Schryver, L. A., Kernit Incinerator Co., Ampere, N. J.

Sorenson, C. V., Utilities Service, Inc., Indianapolis, Ind.

Harrison, A. D., Brooklyn Union Gas Co., Brooklyn, N. Y.

Boylan, David W., General Paint Corp., San Francisco, Cal.

Garrett, A. W., Jr., Henry L. Doherty & Co., New York, N. Y.

Taber, Frank S., Consolidated Gas Electric Light & Power Co., Baltimore, Md.

Goldstein, Maurice, Consolidated Gas Electric Light & Power Co., Baltimore, Md.

Lonergan, Simon J., Bastian-Morley Co., Laporte, Ind.

Keller, Ross E., Electric Bond & Share Co., New York, N. Y.

Overman, Everett F., Consolidated Gas Electric Light & Power Co., Baltimore, Md.

(Continued on page 138)

Monthly Summary of Gas Company Statistics

FEBRUARY, 1930

Issued monthly by the Statistical Department of the American Gas Association
420 Lexington Avenue, New York, N. Y.

PAUL RYAN, Statistician

THE steady and persistent expansion in gas utility sales recorded during most of 1929 continued in December, which witnessed a gain of 11 per cent over the same month of the preceding year, according to reports to the Statistical Department of the American Gas Association from companies representing approximately 80 per cent of the industry.

For the twelve months ending with December these companies reported gas sales of over 446 billion cubic feet, an increase of nearly 10 per cent. Revenues from gas sales aggregated $418,831,103 for the year, representing a gain of 4.1 per cent. On December 31, the customers of these companies totalled 9,738,670, or approximately 2 per cent more than on the same date of the year previous.

When December gas sales are compared with the preceding month of November, however, the gain was only 5 per cent, which is somewhat less than the usual seasonal increase from November to December. This slowing up in the final month of the year was most pronounced in the more highly industrialized states, and a reflection, in large part, of the effects of the recession in general business and industrial activity at the time.

In both Illinois and Michigan gas sales for industrial-commercial purposes declined by nearly 2 per cent from November to December, while in Wisconsin the loss in this class of business amounted to approximately 5 per cent, and in Connecticut to some 6 per cent.

For the year as a whole, however, most sections of the country continued to report satisfactory progress. In New England the year closed with a gain of nearly 6 per cent in gas sales, as compared with an increase of only 1.4 per cent in customers during the same time. A factor contributing materially to this expansion was an increase of 5.8 per cent in gas sales for house heating purposes. The growing importance of this newer use for the gas industry's product is evident from the data relating to New England, indicating that while house heating customers were only one-half of one per cent of the total customers, gas used for house heating purposes represented nearly 7 per cent of the total gas sales for the year in this region.

In the Middle Atlantic States total sales for the year increased 2.5 per cent, in the East North Central States, comprising Illinois, Indiana, Michigan, Ohio and Wisconsin, the increase was 9.1 per cent.

The twelve months ending with December witnessed a continuation of those trends in production which have characterized the industry at large to an increasing extent during the past few years. The volume of water gas produced by these companies during 1929 was about 8 per cent less than for the year previous, while the production of retort coal gas dropped nearly 15 per cent. Marked increases however were registered in the quantity of coke oven gas produced and purchased. The volume of this type of gas produced by the utilities themselves rose some 27 per cent during the year, while coke oven gas purchased from sources outside the industry, such as iron and steel plants, as well as merchant by-product coke oven plants producing gas primarily for city distribution, increased some 29 per cent.

An especially significant feature has been the marked increase in purchases of natural gas during the year, either to supplement existing supplies of manufactured gas or representing purchases for distribution by companies which have changed over to natural gas during the year. This trend was particularly marked in the South Central and Mountain States, as well as on the Pacific Coast, where the completion of new long-distance pipe lines rendered available greatly augmented supplies of the natural fuel.

COMPARATIVE STATISTICS OF 98 UNITED STATES GAS COMPANIES FOR DECEMBER, 1929

	Month of December			*Twelve Months Ending December 31*		
	1929	*1928*	*Per cent Increase*	*1929*	*1928*	*Per cent Increase*
Customers	9,738,670	9,543,635	2.0		*See December*	
Gas Sales (MCF)	41,668,164	37,588,276	10.9	446,293,899	406,195,546	9.9
Revenue (Dollars)	37,705,101	36,209,034	4.1	418,831,103	402,176,030	4.1
Gas Produced and Purchased (MCF)						
Gas Produced						
(a) Water Gas	17,249,973	17,120,827	0.8	177,580,565	192,743,605	— 7.9
(b) Coal Gas	2,588,877	2,873,586	— 9.9	29,406,597	34,390,719	—14.5
(c) Oil Gas	2,771,422	3,465,336	—20.0	31,489,997	30,239,071	4.1
(d) Coke Oven Gas	4,185,428	3,852,726	8.6	48,373,412	38,177,292	26.7
(e) Total Manufactured Gas Produced	26,795,700	27,312,475	— 1.9	286,850,571	295,550,687	— 3.0
Coke Oven Gas Purchased	9,635,167	7,694,036	25.2	103,606,524	80,372,244	28.9
Total Mfd. Gas Produced and Purchased	36,430,867	35,006,511	4.1	390,457,095	375,922,931	3.9
Natural Gas Purchased	10,894,812	8,015,911	35.9	99,834,356	66,710,402	49.7
Total Gas Produced and Purchased	47,325,679	43,022,422	10.0	490,291,451	442,633,333	10.8

Brockton Office Boy Wins Cash Prize

Mr. Heath

The Brockton Gas Light Company recently instituted a contest encouraging its employees to submit practical suggestions of value to the company. Outstanding among the early winners was Lawrence E. Heath, eighteen-year-old office worker, who contributed a valuable suggestion concerning improvements and economies in one of the departments.

Mr. Heath's suggestion lead to an investigation culminating in the discovery of a possibility of saving several hundred dollars each month for the company. The award for his suggestion was a cash prize and, in addition, a better position.

New England Gas Advertising Campaign Wins Recognition

(Continued from page 127)

"The program for 1930 has not been completed as yet but it is expected that a sum equal to that of 1929, if not more, will be expended. Mr. Williams is of the opinion that the campaign will be carried on indefinitely.

"During 1929, 125 New England newspapers were used. These included not only the large city dailies but the small city weeklies and foreign language newspapers. Approximately 1,000,000 lines were used reaching a total circulation of 3,000,000 people and going into 1,000,000 homes. Space ran from full page down to 8 inches, two columns.

" 'In allocating space,' says Mr. Williams, 'the circulation of papers in territories of approximately 50 of the major subscribing companies was plotted to scale on a large map of New England, thus demonstrating visually their overlapping and indirect coverage. With this assistance, a schedule of media, size of copy, and number of insertions was built up.'

"The aim of the copy was to dispel the idea that the gas industry has been put in the background with the advent of electricity. It hoped to wake up the industry from the inertia that has enveloped it in the past and show that gas companies must get out and sell gas just as any other type of merchandise is sold today. It stressed the fact that the industry must sell the public the idea of using gas more as a fuel, as a refrigerant, as a heating unit, not only for water but the whole home as well.

"During the first year of the campaign but little was expected in the line of direct traceable results. The idea was merely to prepare the ground, to stir up thought in preparation for a more intensive drive to sell merchandise. Yet in spite of this fact the gas industry of New England showed an increase of 7 per cent for the first ten months of the campaign. In the one department of house heating, a new department for gas consumption, a gain of more than 60 per cent was noted during this period.

Based on his experience during the eighteen months the campaign has been in force Mr. Williams has learned many fine points about conducting a cooperative newspaper advertising drive. Some of his ideas may be of use to others contemplating similar campaigns in other industries.

" 'Avoid the one-year program,' he says. 'Sell your product on a three-year basis at the least.'

" 'Do your own financing; do not employ professional money raisers.'

" 'Do not load an association secretary or other person with the detail work without additional remuneration. Someone should be employed on at least a half-time basis.'

" 'Do not engage in a good-will or institutional program; make it essentially merchandising in character.'

" 'Do not attempt to sell securities.'

" 'Do not try to sell the idea in a hurry; avoid high-pressure selling methods.'

" 'Be sure that full representation is given to all participating interests. Avoid partiality.'

" 'Do not delegate a task to anyone whose qualifications are doubtful or who will not have the support of those above him in the same company organization.' "

In addition to its newspaper campaign, the New England Gas Association, in January, inaugurated the first New England gas hour radio contest, which is being conducted over stations WBZ and WBZA. In this contest the New England radio audience is given an opportunity to compete for prizes by expressing in a letter of not less than fifty, nor more than one hundred and fifty words, impressions of "what gas means in our homes."

Effect of Atmospheres on Heat Treatment of Metals

(Continued from page 124)

if exposed to air, will suffer some oxidation of their surfaces. Subsequent mechanical operations require that the annealed metal be free from surface oxide. The well-nigh universal corrective is pickling. Industry is becoming increasingly insistent that the corrective be incorporated as a part of the annealing process and that metals be "bright-annealed." This imposes requirements on a heating process which, it can be readily appreciated, are extremely difficult to meet.

Considerable work has been done by industry itself with a view to achieving this end, but apparently no concerted effort had been made to view these operations as a whole and to study the fundamentals involved until the inception of the research activity fostered by the American Gas Association.

Perhaps the most common misconception in relation to bright-annealing is that, oxygen being the offending gas, any means of excluding its presence would of itself insure freedom from oxidation. Of these the simplest and the one most frequently employed is to pack the metal in a container and fill the voids therein with an inert substance. This is known as "pack-annealing." A very large tonnage of steel sheet and strip is so treated. The results to date have been fairly satisfactory. The process is costly, however, and improved methods are eagerly being sought. Similar treatment applied to non-ferrous metals, particularly yellow brass, has never proved successful. There is at present no "bright-annealed" brass being produced in industry. A better understanding of the chemistry of metals will reveal why this is so.

Effects of Atmospheres

The most readily available inert substance with which to fill an annealing

muffle or pack is pure nitrogen. With yellow brass in particular there is no known reaction between its constituent metals and pure nitrogen at the usual annealing temperatures, 700° to 1300° F. Yet repeated attempts to anneal yellow brass in an atmosphere of nitrogen have fallen short of expectations. It must be stressed that these experiments were conducted with commercially pure nitrogen further purified by passing through oxygen-absorbing chemicals and over-heated metallic copper so that the resultant gas was oxygen-free as determined by ordinary chemical analysis. A film of observable zinc oxide invariably was formed when such purified nitrogen was passed over the heated brass.

If the nitrogen, after passing over the heated metal, was caused to bubble through caustic potash solution, the weight of the potash bulb was found to have increased. A search through the literature reveals that considerable work has been done on the occlusion of gases by metals. A general discussion conducted by the Faraday Society (3) lists over seventy-three papers dealing with this matter. A great many subsequent studies have been made. In 1927 the French chemists Guillet and Roux (2) determined that yellow brass when heated would liberate carbon dioxide, carbon monoxide, and oxygen. Whether these gases were occluded within the brass or were in actual chemical combination with the metal was not revealed.

More recent work by the Bureau of Standards has shown that yellow brass is apparently not the only metal capable of containing or retaining gases within the body of the metal. It was found that steel subjected to prolonged heating under vacuum gave off gases which in this case were combustible. This led one facetious newspaper correspondent to express the hope that before long devices might be worked out to propel an automobile from the very gases contained within its metallic frame. Be that as it may, the important facts are that metals do contain gases which are liberated under heat and that these gases are capable of affecting the metal surface, thus eliminating from consideration any process dependent solely upon annealing in a so-called "inert" atmosphere.

It would appear obvious that, if oxidizing gases are given off by the metal, the way to compensate for this is to fill the reaction vessel with a reducing gas. Some progress has been made along these lines. For instance, nickel is now successfully annealed in an atmosphere of pure hydrogen. The preparation of this gas is expensive. Besides, its high explodability introduces an element of danger to the operation. A cheaper source of hydrogen would be blue gas or water gas. For some metals this might prove suitable, but not for nickel, owing to its reactivity with carbon monoxide contained in the gas. A highly reducing gas, such as hydrogen, is not, however, suitable for copper and its alloys. Although very effective in protecting the surface from oxidation, its absorption within the metallic structure under heat gives curious effects. To understand these it is necessary to consider briefly some steps in the process of manufacturing copper.

The purest available commercial copper is that deposited by electrolysis. Electrolytic copper, however, is not sold as such for fabrication into articles of copper. The deposited cathode metal must first be melted down for casting into bars of suitable shape and size. During the melting process some oxygen is absorbed, and this is reduced as far as possible by "poling" the molten bath with wooden poles. Nevertheless, the cast copper contains a slight amount of oxygen which appears as a copper-copper oxide eutectic. When annealed in an atmosphere of hydrogen, this eutectic is reduced with the formation of water vapor, which causes the disruption of the metal structure, resulting in such brittleness that the annealed metal is termed "cold-short" and is unsuitable for drawing into wire or sheet.

Curiously enough, the most common method of annealing copper wire is to heat it in a steam-sealed muffle wherein the wire is completely surrounded by an atmosphere of superheated steam at slightly above atmospheric pressure. To the chemist this process may appear eminently absurd. The earliest lessons in chemistry have taught him that steam passed over heated copper is broken down with formation of copper oxide. The reconciliation of these apparently divergent facts is that the reaction, although actually taking place as it must, does so at a very slow rate. The atmosphere within the muffle is also quiescent. The weight of copper within the muffle is measured in tons; the weight of the surrounding steam in ounces. This weight of copper in the form of copper wire represents acres of reacting surface. Therefore, such oxidation as does take place is not readily observable and the product is acceptable as being commercially "bright-annealed."

Most research chemists have had the unfortunate experience of developing processes which have worked successfully in the laboratory to find their hopes blasted when the process is extended to full-scale operation, owing to the amplification on the larger scale of adverse factors which in the laboratory were so far minimized as to be unobservable. The steam process for annealing copper is here presented as a rare example of a reverse case where on a large scale a process is commercially workable which in the laboratory would be discarded as being theoretically unsound.

The steam process has never proved successful in annealing large copper sheets, nor has it ever worked with brass in any form, for reasons that will now appear obvious.

The effect of a hydrogen atmosphere on copper in causing the metal to become brittle apparently does not produce the same results when applied to alloys of copper, more particularly yellow brass. But its behavior is, however, consistent in that its powerful deoxidizing effect produces a somewhat unexpected result. If a coil of yellow brass sheet is heated to 1150° F. in an atmosphere of flue gas or in the oxidizing atmosphere of a radiant electric furnace, the annealed metal will have the same degree of softness in either case. However, the same brass heated to the same temperature in an atmosphere of hydrogen will be considerably softer, as though it had been heated to a much higher temperature. It is deduced from this that in deoxidizing the heated metal the reaction, which is exothermic, had been sufficiently intense to raise the temperature of the metal itself above that indicated by the pyrometer in the furnace muffle, thus rendering the process uncontrollable.

Effects of Lubricants

Thus far we have considered the effect of these atmospheres on the surface of metals which it has been presumed were "bright" before being subjected to the annealing process. Although the term implies that the metal surface was free from tarnish or oxide, it does not follow that it was also clean. When metals are worked cold by drawing, stamping, or rolling, it is customary to use a lubricant to prolong the life of the die or roll. This may be a mineral oil, fat, soap, or a mixture. The worked metal, ready for the next annealing operation, is invariably coated with a film of the lubricant. If it is a very light mineral oil, there is a chance that the oil will vaporize under heat without marring the surface of the metal. In most cases, however, the lubricant will crack and carbonize on the metal surface in such a manner as to nullify any attempts at bright-annealing. If the atmosphere during annealing is oxidizing, the carbon will burn and dissipate. The metal, however, is then oxidized. If the atmosphere is reducing, the result may be even worse for, whereas the oxidized metal may be subsequently pickled bright, a carbonized surface may defy the action of the strongest pickling bath until the pickle solution has actually dissolved sufficient of the pure metal to loosen the grip of the adhering carbon particles. In either case pickling would have to be employed, thus defeating the very intent of the process.

On these premises, a successful bright-annealing process necessarily involves two stages—an oxidizing phase which will effectively dispose of the lubricant, and a deoxidizing stage in which the reagent is powerful enough to free the metal surface from oxide but without deleterious effects on the internal structure of the metal.

Conclusion

This paper has been presented with a view to outlining the problems involved in atmosphere effects on the heat treatment of metals. An attempt has been made to define more clearly than heretofore the characteristics of these effects and to point a way to the possible solution of these problems. Work is now in progress along the lines indicated. It is hoped that within the near future commercial processes will be developed tending to eliminate or greatly minimize those adverse factors inherent to present methods of heat treatment and that these processes will place the gas industry in a still further preferred position in relation to this whole field.

Literature Cited

(1) Baur and Glaessner, Z. physik. Chem., 43, 354 (1903).
(2) Guillet and Roux, Compt. rend., 184, 724 (1927).
(3) Hadfield, Trans. Faraday Soc., 14, 173 (1919).
(4) Matsubara, Trans. Am. Inst. Mining Met. Eng., 67, 3 (1922).

The Ultimate in Baking

(Continued from page 118)

the next day and the plant schedule is made out according to this.

Water for this plant is obtained from wells drilled on the property and is always at about 50° F., summer and winter. This water is analyzed every month to see that its purity is maintained. Heat is supplied from the company's own boiler room and there is a complete refrigerating plant for cooling the water for the mixers and the big rooms in which are kept the perishable ingredients such as shortening, milk, etc. There are two sets of pumps, two sets of boilers and two refrigerating units, one always being maintained as a standby unit in case the other should fail for any reason.

The General Baking Company maintains its own garage, stable and maintenance department.

Canadian Gas Industry Sets New Records

(Continued from page 108)

adequate and in some cases non-existtent. Some of the industrial heat-treating processes in which research work has been undertaken are: Forging, decarburization of steel, bread baking, brass melting, bright annealing, core baking, ceramics, stereotype melting, etc.

Although the gas industry in Canada has made substantial progress and improvement in recent years, and although throughout the industry there is a pronounced feeling of enthusiasm and pardonable pride in the advances made, nevertheless the industry is constantly on the alert, and through carefully planned and properly directed effort endeavors to secure improvement and economies in every branch of its service.—*The Monetary Times.*

Gas Plant Model May Go to National Museum

(Continued from page 107)

complete the work of the carburetter by fixing or making into permanent gas the vapors in the mixture of gases and vapors leaving the carburetter.

The process or cycle of manufacture is as follows:

The generator is filled with a good quality of coke or anthracite coal and this is ignited. Air is now blown through the apparatus for from two to four minutes or until the coke is incandescent. The hot gases from the burning coke in the generator pass into and through the honey-comb of the carburetter and superheater so that the bricks in those chambers are heated to a dull cherry color. At this time the air is shut off, and steam is sent to the generator. As steam passes through the hot coke, it reacts chemically with the coke producing two gases, carbon monoxide and hydrogen, which pass into the top of the carburetter. The mixture of these two gases is known as blue water gas.

Because this gas mixture has a low heating value it has to be enriched by mixing with it a gas of high heating value derived from gasified oil. To do this, gas oil is sprayed into the top of the carburetter. As this oil passes through the honey-comb of hot bricks in the carburetter, it is broken up into gases which have a high heating value.

The steam passing through the red hot coke in the generator reduces its temperature and, after about 4 minutes of gas making, the fire is cooled to such a point that the reaction does not take place. The steam is now turned off and the air again is passed through the fire and the above process or cycle repeated.

Samuel Insull for Continuance of Bold, Open Policy

(Continued from page 96)

form a very desirable function, and one of great advantage to the industry, if it would educate the managers of our properties to know that the farmer,

whose acres are crossed by our transmission lines, is just as much entitled to service as is the householder in the house or flat in the city, where our mains pass his door.

"Then there is another phase of our business that this Committee can give attention to with great profit. At the recent conferences called by the President at Washington, with reference to the probable conditions of business in 1930, I was particularly impressed by the ease and rapidity with which he was able to obtain information as to what the utilities were going to do throughout the country. Their extensions this year will amount to $1,400,000,000.

"To obtain that money reasonably and economically, we have to go to the investors of the United States. In my judgment we will have to appeal particularly to the small investors. It is particularly desirable that these investors, who are the real owners of our properties, should be encouraged to hold what they have, and to take a great deal more of the same kind of securities.

"Experience, during the recent troubles in the stock market, showed that on the whole the small investor is the last man to be discouraged in his holdings; that he is the first man, after the hurricane has passed, to come out and look for bargains in the issues that he has been in the habit of putting his money into. This Committee can do a very great work for the industry if they will address themselves to keeping up the morale of the small investor.

"The morale of the small investor naturally is much higher than that of the large investor. It takes a great deal longer to scare him than it takes to scare the large investor. In saying that, I am speaking of what I know of the vicissitudes of the business.

"I think this Committee can do a great deal to help keep our investors in a proper state of mind, to help create a further crop of new investors, and, in short, to help us get the billion and a half of dollars we need this year for all of the electric light, gas and street railway utilities of the country.

"Before taking my seat, I would like to refer to the troubles the industry as a whole has gone through because of the agitation in Congress, and the investigation of the Federal Trade Commission. The thing that has really affected us has been the off-hand—and you will excuse me for putting it in blunt language—the damn fool remarks of some publicity agent, or of some corporation official who is more fond of seeing his thoughts on paper than he is of considering what will be the effect of what he has written down.

"The thing above everything else that I would warn you about, is to judge what you say or what you may write by the effect that you think, after a little consideration, it will probably produce upon the man or the woman who reads it, or upon the audience which hears it.

"You are charged with a great responsibility. You are engaged in a business that is always in the public eye. Be sure your statements are absolutely true, in word and in fact. Be sure that only such statements are made, whether in a private letter or in a public communication, as will always stand in the light of day. If you do these two things, you may be sure that nothing that you do or say will bring discredit upon this great industry, the interests of which we all of us have so much at heart."

Foundries Turn to Gas Fuel for Annealing

(Continued from page 106)

Link Belt Company

Gas Rate	*Consumption*	*Cost Per Ton*
$1.00 per M	4800 cu.ft.	$4.80
.90	4800	4.22
.80	4800	3.84
.70	4800	3.36
.60	4800	2.88
.55	4800	2.64
.54	4800	2.59
.53	4800	2.54
.52	4800	2.49
.51	4800	2.44
.50	4800	2.40

The above are the fuel and energy costs alone and without taking into consideration the other factors detailed in the body of this article.

Taking another example where four heats were put through the gas furnace at Link Belt and 79,318 pounds of castings, or approximately 40 tons of castings, were annealed with a gas consumption of 4000 cu.ft per ton. Now the best that could be done with an electric furnace was 20 tons in the same time period. With a gas rate of say 60 cents per M the cost would be $2.40 as against the electric, using 300 KW per ton at .01 cent per KW, of $3 per ton. On this basis the gas furnace could produce 40 tons of castings at a cost of $96 against a cost of $60 for 20 tons from the electric furnace or a saving per day of $36 in favor of gas.

Our New Members

(Continued from page 133)

Carl, G. Herman, Consolidated Gas Electric Light & Power Co., Baltimore, Md.
Nichols, Henry J., Jr., Standard Oil Co. of New Jersey, New York City
Barr, Robert T., The Brooklyn Union Gas Co., Brooklyn, N. Y.
Hawley, James F., The Brooklyn Union Gas Co., Brooklyn, N. Y.
McCabe, John V., The Brooklyn Union Gas Co., Brooklyn, N. Y.
Loomis, Richard B., The Brooklyn Union Gas Co., Brooklyn, N. Y.
Beck, Gebhard C., The Brooklyn Union Gas Co., Brooklyn, N. Y.
Herty, Frank B., The Brooklyn Union Gas Co., Brooklyn, N. Y.
Prendergast, William H., The Brooklyn Union Gas Co., Brooklyn, N. Y.
Geiger, Charles, The Brooklyn Union Gas Co., Brooklyn, N. Y.
Nodine, Harry C., The Brooklyn Union Gas Co., Brooklyn, N. Y.
Perry, Thomas J., The Brooklyn Union Gas Co., Brooklyn, N. Y.
Troell, Lewis S., The Brooklyn Union Gas Co., Brooklyn, N. Y.
McCabe, George P., The Brooklyn Union Gas Co., Brooklyn, N. Y.
Forrest, John, The Brooklyn Union Gas Co., Brooklyn, N. Y.
Haab, George P., The Brooklyn Union Gas Co., Brooklyn, N. Y.
Kamke, Walter F., The Brooklyn Union Gas Co., Brooklyn, N. Y.
Swann, William T., The Brooklyn Union Gas Co., Brooklyn, N. Y.
Gallagher, Stephen F., Equitable Gas Co., Pittsburgh, Pa.
Wolf, Frederick N., Equitable Gas Co., Pittsburgh, Pa.
Brigden, Fuller E., Pittsburgh & West Virginia Gas Co., Pittsburgh, Pa.
Dodd, Edward A., Standard Oil Co. of New York, New York, N. Y.
Quad, Harold F., Public Service Electric & Gas Co., Newark, N. J.
Kinne, Raymond C., State University of Iowa, Iowa City, Iowa
Barnett, R. G., Emprezas-Electricas Brisaleras, Rio de Janiero, Brazil
Lynch, H. E., B-Line Boiler Co., Cleveland, Ohio
Hodges, Earle W., Henry L. Doherty & Co., New York, N. Y.
Young, W. W., Jr., Robbins Publishing Co., New York, N. Y.
Tenney, Rockwell C., Charles H. Tenney & Co., Boston, Mass.
Williams, Charles A., Charles H. Tenney & Co., Boston, Mass.
Davidson, William E., Westchester Lighting Co., Mt. Vernon, N. Y.
Benson, Francis W., American Meter Co., Philadelphia, Pa.
Van Wart, Warren, Westchester Lighting Co., Mt. Vernon, N. Y.
Magee, Edwin W., Westchester Lighting Co., Mt. Vernon, N. Y.
Price, H. C., Sears, Roebuck & Co., Chicago, Ill.
Longgood, Eugene A., Northern Indiana Public Service Co., Hammond, Ind.
Keller, Elroy N., Philadelphia Electric Co., Philadelphia, Pa.
Kelly, John Eoghan, Consulting Engineer, 17 Battery Place, New York City
Gaty, Lewis R., Philadelphia Electric Co., Norristown, Pa.
Channing, C. F., Argus Gas & Fuel Co., Dodge City, Kansas
Mitten, George R., Public Service Co. of N. Illinois, Chicago, Ill.

Associations Affiliated with A. G. A.

Canadian Gas Association

Pres.—Kenneth L. Dawson, Nova Scotia Light & Power Co., Ltd., Halifax, N. S.
Sec.-Tr.—G. W. Allen, 21 Astley Avenue, Toronto.

Colorado Utilities Association

Pres.—H. S. Robertson, Denver Tramway Corp., Denver, Colo.
Sec.-Tr.—O. A. Weller, Public Service Co. of Colo., Denver, Colo.

Empire State Gas and Electric Association

Pres.—William J. Welsh, New York & Richmond Gas Co., Staten Island, New York.
Chairman Gas Section—R. Van Vliet, New York & Richmond Gas Co., Staten Island, N. Y.
Sec.—C. H. B. Chapin, Grand Central Terminal, New York, N. Y.

Illinois Gas Association

Pres.—E. E. Lungren, Western United Gas & Electric Co., Aurora, Ill.
Sec.-Tr.—George Schwaner, 305 Illinois Mine Workers Bldg., Springfield, Ill.

Indiana Gas Association

Pres.—C. L. Kirk, Citizens Gas Co., Indianapolis, Ind.
Sec.-Tr.—F. W. Budd, Central Indiana Gas Co., Muncie, Ind.

Michigan Gas Association

Pres.—A. I. Snyder, Detroit City Gas Co., Detroit, Mich.
Sec.-Tr.—A. G. Schroeder, Grand Rapids Gas Light Co., Grand Rapids, Mich.

Mid-West Gas Association

Pres.—E. H. Vieregg, Central Power Co., Grand Island, Nebr.
Sec.-Tr.—Roy B. Searing, Sioux City Gas & Electric Co., Sioux City, Iowa.

Missouri Association of Public Utilities

Pres.—T. J. Strickler, Kansas City Gas Co., Kansas City, Mo.
Sec.-Tr.—F. D. Beardslee, 315 N. 12th St., St. Louis, Mo.

New England Gas Association

Pres.—J. J. Quinn, Boston Consolidated Gas Co., Quincy, Mass.
Exec. Sec.—C. D. Williams, 41 Mount Vernon St., Boston, Mass.
Chairman Operating Div.—Isaac T. Haddock, Cambridge Gas Light Co., Cambridge, Mass.
Secretary Operating Div.—H. G. Taylor, Lawrence Gas & Electric Co., Lawrence, Mass.
Chairman Sales Div.—J. H. Sumner, Cambridge Gas Light Co., Cambridge, Mass.
Sec.-Tr. Sales Div.—A. M. Slattery, Hoffman Heater Co., Boston, Mass.
Chairman Industrial Div.—L. B. Crossman, Boston Consolidated Gas Co., Boston, Mass.
Sec.-Tr.—Industrial Div.—Chas. H. O'Donnell, Boston Consolidated Gas Co., Boston, Mass.
Chairman Acctg. Div.—R. D. Washburn, Massachusetts Lighting Co., Boston, Mass.
Sec.-Treas. Acctg. Div.—Otto Price, Boston Consolidated Gas Co., Boston, Mass.
Chairman Manufacturer Div.—T. H. Piser, Welsbach Co., Boston, Mass.
Sec.-Treas. Manufacturers Div.—J. H. McPherson, 250 Stuart St., Boston, Mass.

New Jersey Gas Association

Pres.—R. A. Koehler, Public Service Electric & Gas Co., Newark, N. J.
Sec.-Tr.—H. E. Cliff, Public Service Electric & Gas Co., Newark, N. J.

Ohio Gas and Oil Men's Association

Pres.—L. K. Langdon, Union Gas & Electric Co., Cincinnati, Ohio.
Sec.-Tr.—Wm. H. Thompson, 811 First National Bank Bldg., Columbus, Ohio.

Oklahoma Utilities Association

Pres.—T. R. Weymouth, Oklahoma Natural Gas Corp., Tulsa, Okla.
Mgr.—E. F. McKay, 1020 Petroleum Bldg., Oklahoma City, Okla.

Pacific Coast Gas Association

Pres.—F. H. Bivens, Southern Counties Gas Co., Los Angeles, Calif.
Mang. Dir.—Clifford Johnstone, 447 Sutter St., San Francisco, Calif.

Pennsylvania Gas Association

Pres.—W. A. Norris, Lebanon Valley Gas Co., Lebanon, Pa.
Sec.-Tr.—Frank W. Lesley, Pennsylvania Gas & Electric Co., York, Pa.

Pennsylvania Natural Gas Men's Association

Pres.—Geo. E. Whitwell, Equitable Gas Co., Pittsburgh, Pa.
Sec.-Tr.—B. H. Smyers, Jr., 435 Sixth Ave., Pittsburgh, Pa.

Southern Gas Association

Pres.—D. H. Levan, Jacksonville Gas Co., Jacksonville, Fla.
Sec.-Tr.—G. H. Schlatter, Birmingham Gas Co., Birmingham, Ala.

Southwestern Public Service Association

Pres.—Knox Lee, Southwestern Gas & Electric Co., Marshall, Texas.
Chairman Gas Section—Frank L. Chase, Lone Star Gas Co., Dallas, Texas.
Sec.—E. N. Willis, 403 Slaughter Bldg., Dallas, Texas.

The Public Utilities Association of Virginia

Pres.—C. B. Short, Roanoke Railway and Electric Co., Roanoke, Va.
Sec.— C. O. Robertson, P. O. Box 537, Roanoke, Va.

Wisconsin Utilities Association

Pres.—G. W. Van Derzee, The Milwaukee Electric Railway & Light Co., Milwaukee, Wis.
Exec. Sec.—J. N. Cadby, 105 Wells St., Milwaukee, Wis.

Twelfth Annual Convention of the American Gas Association
Atlantic City, N. J. - - - October 13-17, 1930

Employment Bureau

SERVICES REQUIRED

Old Established Manufacturer of small gas appliance accessories located in the Middle West has opening for man with creative or inventive ability for the design and development of new devices. State age, education, experience and salary desired in first letter. 0155.

Large Eastern Utility (New York State) desires a few recent technical graduates to specialize in gas engineering. Applicants should give full particulars as to education, experience, references, etc. 0156.

Sales Engineers wanted by large public utility in the Middle-West. Experienced in commercial and residential heating. Must be a high school graduate. College graduate from an engineering course preferred. Permanent position. Please state age, experience, education and salary expected. 0158.

Wanted—Assistant to executive, thoroughly experienced engineer-salesman, capable as organizer and competent to analyze and develop house heating, industrial applications and appliance sales. Prefer single man although not essential. Must be firm believer in stability of gas industry, energetic and of unquestioned integrity. Must be able to submit record of achievement. 0160.

Experienced industrial gas salesmen for large operating gas company. 0163.

Salesmen to sell gas to industries. Experienced men preferred. 0164.

Graduate gas engineer wanted by Eastern New York public utility. Five or six years experience in gas production and/or distribution and transmission work in connection with high and low pressure systems. Give age, education, experience and references. 0165.

Well known appliance manufacturer has opening for office manager to handle correspondence, maintain and initiate contacts with gas company sales executives and dealers. Man having sales experience or who has acted as appliance manufacturers' representative preferred. Salary to start $250 to $300; full details of experience, age, etc., must be outlined. Office and plant located at Newark, N. J. 0166.

SERVICES OFFERED

Gas Engineer, College education, with 12 years experience, first four years with Coal Gas & Electric Co., last eight years as manager of small Water Gas Co., desires position as manager or assistant manager of a gas or combination company. 285.

A Technically Educated Gas Engineer, now employed, with 15 years experience in Coal and Water Gas Operation, Distribution and Industrial Sales, desires new connection. 299.

Engineer, technically educated, wide general engineering experience, successful in handling men, maintaining record efficiency and reducing costs as head of department in large gas company. 302.

Available, New Business and Commercial Manager. Age 30, married. Has successful record merchandising gas appliances, house heating, etc., with Public Utility. Desires position in Commercial Field. Technical education and familiar with Engineering problems and Office routine. Good executive. 303.

Meter Foreman desires position with gas company. Experienced in all makes of meters. Best of references to character and ability. 305.

Gas Engineer, college education, six years' experience in gas distribution, both H.P., M.P. and low pressure, and water-gas manufacturing from 3,000 M per day plant to 15,000 M per day plant, and general gas company construction, desires engineering position as manager, assistant manager, or superintendent. 306.

Commercial manager for 10 years of large Southern company with 8000 meters desires new connection. Experienced in industrial work and hotel and restaurant business, as well as advertising and general duties of commercial manager. Speaks Spanish. Good references. 309.

CONFIDENTIAL SERVICE

A confidential service available to members, whereby those seeking men and those seeking positions may be brought together. In addition to the advertisements which appear in these columns, information filed on the regular confidential qualification form will be utilized for the benefit of companies seeking the services of executives, engineers, operators, salesmen and others.

Company and individual advertisers are requested to inform the Employment Bureau immediately a position has been filled or accepted; all advertisements should be received at A. G. A. Headquarters not later than the seventh of the month to insure insertion in the next issue.

Utility Executive Available—Public Utility Executive available as President or Vice-President of holding company or operating company, or as Utility Adviser to Bank, Investment Trust, Brokerage or Investment House. Have had twenty years' experience in all branches of Utility business, including organization, financing, construction, operation, public relations and sales. Gas, natural and manufactured, electricity, ice, heat, water, merchandise and securities. 310.

Public Utility Executive, capable management, medium-sized property, has had long experience all branches both gas and electric utilities, versed in sales management, public relations, accounting, rate revision and Commission presentation. Desire connection with Public Utility where residence in or near New York City is possible. 312.

Manufacturer's Executive, having extensive manufacturing experience, in gas and coal range lines, also successful record in sales representation and management, desires to associate with progressive manufacturer. Compensation to be based on actual accomplishments. 313.

Public Relations Executive, available. Experienced as newspaper executive, special writer, organizer and public contact man. Excellent references. 314.

Specialist in tar utilization and by-product coke manufacture desires responsible position. Capable of directing large scale operation. 316.

Successful industrial engineer of several years broad experience; also technically trained in production and distribution; college graduate. 317.

Combustion Engineer of long experience in gas utilization, now employed in a consulting capacity. Two degrees in Chemistry. Sales Engineering and Research experience. Resourceful and creative. Specialist in fuel economics for steel, glass, ceramics, and general manufacturing. Very familiar with gas manufacture and related processes. Good investigator. Reports clearly and forcefully. Permanent position only. Salary befitting training and experience. 319.

Gas Engineer with technical education and over fifteen years experience in the design, construction and operation of all types of coal carbonizing plants desires to make a connection where training and experience can be used to advantage. 320.

Merchandising Manager desires to change to South or West. Twenty years in gas and electric merchandising. Thoroughly familiar with industrial, commercial and domestic appliances, as well as refrigeration, ranges and small electric appliance merchandising. Can handle men and has a credible record of achievement. Available March or April first. 321.

Gas Sales Executive, now completing a successful three years' load building program of a large Middle West Natural Gas Company, will be available on or about March 1, 1930. Capable sales executive and organizer with a technical and legal training. 322.

Sales Manager with gas and electric company or gas alone. Prefer Connecticut or New York State. Eighteen years' experience. 323.

Over twenty years of experience with one public utility company in all angles of the gas industry are behind the writer of this advertisement. He has been Constructing and Operating Engineer on both Plant and Distribution work, Sales Manager, Advertising and Publicity Manager and a successful handler of employees and the public. He possesses good health and has the qualities of initiative, versatility, adaptability and promotion of goodwill. His natural talents are executive and managerial. He is not shooting at the stars, but desires a position of responsibility where his experience and wide range of activity will be of value to his employer. 324.

Available, new business manager or executive's assistant. Age 35. Married. Graduate Engineer, with coal gas and water gas plant experience and successful industrial gas and house heating management experience in large companies. Have had ten year connection in aggressive companies in the gas industry. 325.

Experienced house heating and industrial sales engineer. Would be very valuable to a company that has not gone into this type of sales. 34 years of age, married. 326.

Young man, 32, with eight years experience in number of combination companies, with single firm, desires position of Assistant to Executive. 327.

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